Metals Review
THE NEWS DIGEST MAGAZINE
Volume XXIII - No. 10 October 1950

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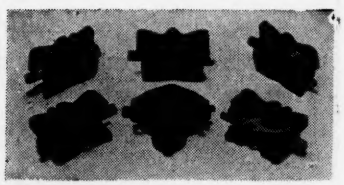
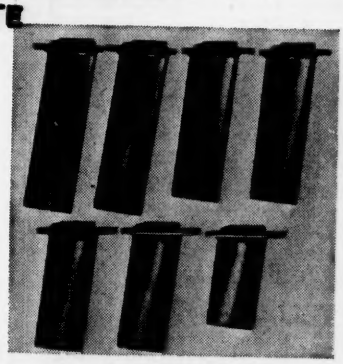
BLACK . . . All SAE and NE Steels
. . . All types of Stainless Steels
. . . Cast Iron
. . . Malleable Iron

PROCESS CYCLE—1. Wash with alkali cleaner.
2. Rinse in cold water.



Cast Iron

3. Dip in Holden Pre-Clean Chemical at 160-180° F. for 30 seconds to one minute.
4. Quench in cold water.
5. Process in Holden Perma-Black—average time 5-10 minutes.



Stainless Steel

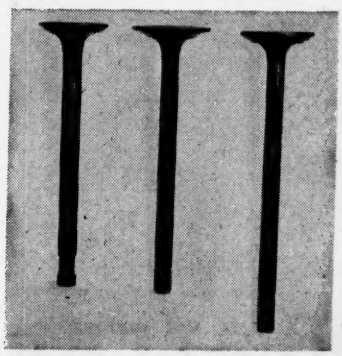
6. Rinse in cold water.
7. Oil with soluble oil or other suitable rust preventive.

By following the process sequence, any hardened part can be blackened if the surface is properly cleaned. This is irrespective of whether the part has been hardened in cyanide, case hardening baths, or oven furnaces. The process is positive because all alkalis are eliminated previous to blacking, and with the use of Holden Pre-Clean Chemical, any solids from the water rinse are neutralized. Further, the Pre-Clean Chemical furnishes a surface which is perfectly clean so that blacking starts at the grain boundaries . . . there is therefore no build-up of solids or other inert materials to effect the blacking process.

Specific Weight: Because only 3½ lb. are used per gallon, as compared to 7 to 10 lb. of other products, the carry-out from the solution is less, and there is very little precipitation out of crystals when the solution is cool—therefore, heat recovery is faster.

Advantages: 1. Lower temperature (240-260° F.).
2. 3½ lb. maximum per gallon of water vs. 7 to 10 lb. of other blacking salts.

GUARANTEE: This new blacking process can be used with your present equipment with only minor variations. Order a month's supply—we guarantee cost of operation in your Blacking Department will be reduced from 36 to 60%.



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OAKLAND, CALIFORNIA

Metals Review

THE NEWS DIGEST MAGAZINE

VOLUME XXIII, No. 10 OCTOBER, 1950

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Progress Report On Ductile Iron Gives New Data

Reported by F. R. Morral
Associate Professor, Syracuse University

New technical and industrial developments in "Ductile Iron" were presented by G. L. Cox, development and research division, International Nickel Co., Rochester, N. Y., to the Syracuse Chapter on Sept. 12. Mr. Cox had spoken before this chapter previously (*Metals Review*, March 1950, page 16), and his talk was in the nature of a progress report.

An estimated 50% of the reason for using this material is implied by the term, "ductility," believes Mr. Cox. Other reasons are accounted for by its strength, hardness, endurance, wear and heat resistance, good galling resistance, and good flame hardening properties.

This material is being made daily by more than 60 foundries in the U. S. and more than 20 in Europe. Some parts have been made weighing up into the tons; others as small as a few ounces. The cross-sections of some of these castings, as illustrated by slides, varied from several inches to a small fraction of an inch.

Some advance has been made in understanding the characteristics of the material, Mr. Cox continued. On the basis of data now collected, a relationship band has been compiled for hardness vs. elongation and for hardness vs. tensile strength, based on 1-in. test bars. Samples falling outside of this band have had good reasons for doing so; some of the reasons are simple, such as defects in the test specimen, or wide variations in chemical composition and heat treatment; other metallurgical considerations appear to be more complex, and some have not been discovered as yet. This relationship band applies to both as-cast and annealed material, and therefore is most useful in the selection and treatment of the material.

International Nickel has set up tentative specifications for ductile iron into four classifications. The American Society for Testing Materials and American Society of Mechanical Engineers are also working on specifications.

Mr. Cox also showed slides summarizing some of the properties being studied for this material. Compression strength is similar to that of steel; the galling resistance is as good as that of low-strength gray cast iron. Some data are available on fatigue characteristics; on unnotched specimens the ratio of fatigue strength to tensile strength is about 0.34 (0.44 for forged steel), while the notched specimens showed a more favorable value (0.26 vs. 0.22 for forged steel).

Heat treatment is simple and flexible. It consists of the carbide solution treatment—if desired or necessary—at 1650° F., followed by a longer ferritizing treatment at 1275° F. If the casting has satisfactory hardness as cast (which is related to elongation and tensile strength as indicated above), the 1275° F. hold is all that is necessary, and this serves also as a stress-relieving treatment. Austenitic Ni-Resist and martensitic Ni-Hard are improved by the introduction of magnesium in that strength and toughness are improved.

Several applications, both large and small, of castings made in the various grades of ductile iron were shown, In numerous instances the new material did better work than the material it replaced, namely, gray cast iron, malleable iron and steel castings. Mr. Cox foresees that this material may have an important part in a future armament program and thus relieve some pressure from the forging and steel castings industries.

As a coffee talk, C. A. Edson of the Federal Security Agency spoke on the pertinent subject of the new Social Security Program and advised the need of developing hobbies for a longer and fuller life.

Chicago Golfers

Snapped at the Chicago Chapter's Annual Golf Party on August 19 Are: Joe Kubik of Stewart Warner; Elmer Terwell, Rolock, Inc., a Past Chapter Secretary; Roy Prange, Ipsen Furnace Co.; and Walt Weinwurm, Union Special Machine Co.

John Wallerius, Sunbeam-Stewart Industrial Furnace; O. J. Arness, Hotpoint; Stanley Yates, Audubon Wire Cloth; and Ken Hobbie of Driver Harris, a Former Chapter Secretary

From Left: C. T. Prendergast of Western Electric Co., Chapter Vice-Chairman; J. Walter Scott and Terry Westhafer, Also of Western Electric; and Harold Geiger of International Nickel Co., a Past Chairman

Temple and Phila. Chapter Start 30th Evening Course

For the 30th consecutive year Philadelphia Chapter is sponsoring evening courses in metallurgy at Temple University, according to A. M. Bounds, chairman of the Educational Committee.

The course is unique among chapter educational services, not only in its longevity but also in its cumulative turnout of close to 3000 students, and in the teamwork involved between the university, the chapter and local industries.

The original arrangement between Temple and the Philadelphia Chapter was that the school would provide the classrooms and facilities, while the chapter would be responsible for the instructors. This plan still holds, and in the intervening years the chapter has also solicited donations of equipment from many firms so that the laboratory is now one of the best equipped of its kind in the country.

The basic first year's course extends for 30 weeks of lectures, with laboratory work optional. A second or advanced certificate course is available for those who complete the first and desire more comprehensive instruction.

Walter Kinderman, research engineer, Yarnall-Waring Co., is director of the course, and all of the instructors are members of the chapter, who donate their evenings to the project. Horace C. Knerr, president of Metallurgical Laboratories, Inc., previously served as director for 25 years, and was elected director emeritus in 1949.

Powder Metal Course Offered

The Graduate Division of New York University College of Engineering is offering a course on "Powder Metallurgy" during the first term of the academic year 1950-51. This course, initiated during World War II but later discontinued, will be given by Adjunct Associate Professor C. G. Goetzel. It will cover a fundamental treatment of powder metallurgy.

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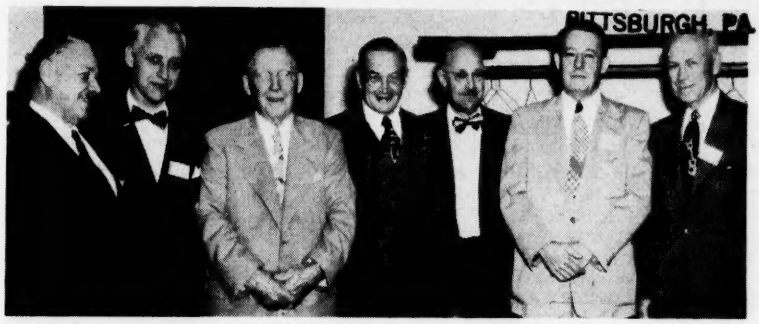
Tri-City Honors Old-Timers



National Secretary Eisenman (Left) Introduces Tri-City 25-Year Members: George A. Uhlmeyer, Iowa-Illinois Gas & Electric Co.; C. U. Scott, C. U. Scott & Sons, First Chairman; C. O. Parish, International Harvester Co.; A. H. Putnam, A. H. Putnam Co.; John F. Taylor, Crucible Steel Co. of America; and C. H. Burgston, Deere & Co., a Charter Member. Missing from the picture are Hyman Bornstein, Deere & Co.; William M. Donohoo, Donohoo Steel Treating Co.; Verne Johnson, John Deere Waterloo Tractor Works; and William A. Salt, American Machine & Metals Co.

Reported by A. H. Rauch
Deere & Co.

Approximately 100 members and guests of the Tri-City Chapter A.S.M. gathered at Rock Island Arsenal on Sept. 12 to greet National Vice-President Walter E. Jominy and National Secretary W. H. Eisenman and to honor 25-year members and sustaining members. This meeting also marked the 30th anniversary of the founding of the chapter.

On behalf of the national office and the chapter, Mr. Eisenman presented silver lapel buttons and certificates to ten members in recognition of 25 years or more in the Society. He then told of the organization meeting of the chapter in 1920 at the Blackhawk Hotel, Davenport, Iowa. C. U. Scott, first chairman of the chapter, and C. H. Burgston, a charter member, related interesting anecdotes of some of the early national conventions of the society.

A. J. "Steve" Andre, Chapter Chairman, presented certificates to the sustaining members of the society in recognition of their support and interest in the progress and activities of the chapter. The sustaining members include: American Machine & Metals Co., Bettendorf Co., J. I. Case Co., Deere & Co., Donohoo Steel Treating Co., International Harvester Co., and C. U. Scott & Sons.

Mr. Jominy delivered the technical address of the evening on "Combatting Wear With Metallurgy". Since he will present this same subject before many other chapters, his talk is not reported in detail here.

Describes Coatings Used To Combat Corrosion

Reported by L. F. Janssen
John Deere Des Moines Works

The cause of corrosion and means of combatting it were graphically illustrated and described by V. M. Darsey, vice-chairman of the board of the Parker Rust Proof Co., speaking before the Des Moines Chapter A.S.M. in September.

A group of slides and graphs were used to show the resistance to corrosion afforded by Parkerizing and Bonderite as indicated by accelerated and outdoor exposure test. The Bonderite process converts the surface of metals to an insoluble phosphate coating. It provides excellent adherence for paint finishes.

Many manufacturers treat the bearing surface of engine parts in Parco Lubrite to provide improved lubrication, facilitate break-in, and reduce wear, Mr. Darsey said.

A more recent application of Bonderite is found in the seamless tubing industry, where it is used to facilitate the drawing of both carbon and stainless steel.

Kansas City Has Family Picnic

Reported by John F. Puterbaugh
Midwest Research Institute

In July 100 A.S.M. members, wives and children attended a family picnic get-together at Kansas City's Municipal Swope Park. Ham sandwiches with trimmings were enjoyed by all and liquid refreshments were available throughout the evening.

Financial arrangements were handled by a fixed charge for each adult, the children being admitted free, and the chapter absorbing the difference between costs and amount received. Congratulations for a well-handled affair were given Robert Scrom, of Sheffield Steel Corp., and his entertainment committee.

Charter Members' Deeds And Doings Recounted In Slide and Song

Reported by Kenneth B. Lloyd
Engineering Research Project Metallurgist, University of California

An unprecedented turnout of the farflung membership of the Golden Gate Chapter A.S.M. honored the remaining charter members of the chapter at the Twenty-fifth Anniversary meeting on June 12.

Charter Member Frank B. Drake, head of the Johnson Gear and Mfg. Co., Ltd., the second chairman and the Chapter treasurer for the past 13 years, recounted the "borning" pangs of the Golden Gate group. He told of its chartering in 1925 by the then "American Society for Steel Treating". As the 34th chapter, Golden Gate entered the Society with 102 charter members—a record to that date.

The portion of the evening program honoring the old-timers was directed by Bert DePew. After their deeds and doings had been aptly recounted in slide and song, each charter member received an appropriate 25-year wall plaque and the original cartoon drawing for his slide.

Speaker of the evening was Frank E. Marsh, executive vice-president and general manager, San Francisco Bay Area Council. He told the chapter of the aims and problems of his group in area planning. Transportation and housing are the greatest needs for continuing development, he pointed out. Mr. Marsh shattered some myths in declaring that industries attracted to an area by subsidies, such as tax or other concessions, are usually not worth it; as he expressed it: "Desirable new businesses stand on their own feet."

The continuing industrial development of the Bay area, providing new users, new customers, and new fabricators of metals, would be both furthered and climaxed by the building of another Bay crossing—a matter of 150 million dollars worth of materials, mostly metals!

Steel Founders Offer Prizes

Institution of a national awards program, with $1000 in cash prizes offered for technical papers dealing with new designs, redesigned steel castings, conversions and advanced uses for steel castings is announced by the Steel Founders' Society of America.

In all 15 awards will be made, with a top prize of $300 for the paper judged most useful. Closing date for the competition is Dec. 1, 1950. Entries and requests for rules and further information should be sent to: Award Committee, Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15.

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Akron	Nov. 8	University Club	R. C. Clark	Sustaining Members Night
Baltimore	Nov. 20	Engineers Club	P. G. Dehoff, Sr.	Aviation Gas Turbines
Boston	Nov. 3	Hotel Shelton	V. W. Whitmer	Production and Use of Stainless Steel
Buffalo	Nov. 9	New York State Inst. of Applied Arts & Sciences		Inspection of Facilities
Calumet	Nov. 14	Phil Smidt & Son, Hammond, Ind.	J. L. Block	Steel & National Defense
Canton-Massillon	Nov. 6	Mergus Restaurant	Morris Cohen	Tempering of Steel
Cincinnati	Oct. 12	Engineering Society	A. R. Troiano	Hardenability of Alloy Steels and the End-Quench Test
Cleveland	Nov. 6	Tudor Arms Hotel	N. K. Koebel	Practical Heat Treating
Columbus	Nov. 2	Central High School	Tom Campbell	Industry's Future—Freedom, Straight-Jacket or Hobble
Dayton	Nov. 8	Engineers' Club	Morris Cohen	Heat Treatment of Steel
Detroit	Nov. 13	Rackham Memorial Building	M. J. Day	Transformation Data Applied to Heat Treatment
Eastern N. Y.	Nov. 14	Circle Inn, Lathams	A. J. Pepin	New Developments in the Forging of Metal
Ft. Wayne	Nov. 13	Chamber of Commerce	R. J. Peters	Heat Treating of Gears
Hartford	Nov. 14		L. P. Tarasov	Some Metallurgical Aspects of Grinding
Lehigh Valley	Nov. 3	Hotel Traylor, Allentown, Pa.	E. C. Bain	A Half-Century of Metallurgical Progress
Los Alamos	Nov. 10	Little Theater	H. H. Hausner	Powder Metallurgy as a Research Tool
Los Angeles	Nov. 16	Rodger Young Auditorium	Clarence H. Sample	Value of Protective Finishes
Louisville	Nov. 7	Mayflower Hotel	J. C. McDonald	Future Developments of Magnesium
Mahoning Valley	Nov. 8	Post Room V.F.W.	W. E. Jominy	The Hardenability of Steel
Milwaukee	Nov. 21	City Club	John Graham	Materials Engineering
Montreal	Nov. 6	Spanish Room Queen's Hotel	C. A. Zapffe	A New Theory for the Solid State
New Haven	Nov. 16	Hammond Laboratory, Yale University	C. E. Birchenall	Radioactive Tracers
New Jersey	Nov. 20	Essex House	W. M. Baldwin, Jr.	Residual Stresses in Metals
North Texas	Nov. 8	Blackstone Hotel, Fort Worth		Sustaining Members Night
Northwest Pa.	Nov. 16	Titusville, Pa.	J. J. Williams	Industrial Waste Disposal
Notre Dame	Nov. 8	Engineering Bldg.	W. C. Wall	Plastics vs. Metals
Ontario	Nov. 3	Royal Connaught Hotel, Hamilton	T. C. Dumond	New Developments in Materials
Ottawa Valley	Nov. 7	Mines Branch	C. A. Zapffe	A New Theory for the Solid State
Peoria	Nov. 13	Morton, Ill	Samuel L. Hoyt	The Metallurgy of Welding
Philadelphia	Nov. 24	Engineers' Club	Walter Jominy	Present Status of Hardenability
Pittsburgh	Nov. 9	Roosevelt Hotel	W. E. Jominy	The Effect of Hardenability on Mechanical Properties of Tempered Steels
Puget Sound	Nov. 14	Weyerhauser Timber Co., Everett, Wash.		Plant Visitation
Purdue	Nov. 14	Purdue Union Club	H. F. Moore	Fatigue of Metals
Rhode Island	Nov. 1		W. R. Fraser	A Mid-Century Review of High Speed Steel
Rochester	Nov. 13		Norman O. Kates	Heat Treating
Rockford	Nov. 15	Faust Hotel	Kenneth J. Yonker	Precision Investment Casting
Rocky Mountain				
Denver	Nov. 17	Oxford Hotel	A. E. Focke	
Pueblo	Nov. 16	Minnequa Club	A. E. Focke	
Saginaw Valley	Nov. 14	Fischer Hotel	John Marsh	Steel Making
St. Louis	Nov. 2	Engineers Club	Hiram Brown	Recent Developments in Alloys and Fabrication of Aluminum
Southern Tier	Nov. 13	Hotel Frederick, Endicott, N. Y.	L. P. Tarasov	Grinding
Terre Haute	Nov. 6	Indiana State Teachers College Student Union		Contour Sawing and Filing
Texas	Nov. 7	Ben Milam Hotel	G. E. Brumbach	Toolsteels—Their Use and Misuse
Toledo	Nov. 16	Maumee River Yacht Club	Bob Snowden Jack Succop	Advances in Nondestructive Testing Methods
Tri-City	Nov. 7	Rock Island Arsenal Cafeteria	H. A. Wilhelm	Peacetime Applications of Atomic Energy
Tulsa	Nov. 13	Carosel Restaurant	M. F. Judkins	Toolsteels
Utah	Nov. 23	Hotel Newhouse	Clarence Sample	Protective Value of Electrodeposited Coatings

Warren	**Nov. 9**	El Rio Restaurant	**A. F. Holden**	**Salt Baths**
Washington	**Nov. 13**	Dodge Hotel	**S. Marshall**	**The Turbohearth Process and Other Recent Developments in Steel**
Wichita	**Nov. 21**	K. of C. Clubhouse		**Aircraft Aluminum**
Worcester	**Nov. 8**	Worc. Poly Tech. Inst.	**L. B. Burnham**	**Metal Spinning**
York	**Nov. 8**			**Review of Steel Making Processes**

IMPORTANT MEETINGS
for November

Nov. 1-2—Porcelain Enamel Institute. 19th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, West Va. (P.E.I., 1010 Vermont Ave., N.W., Washington 5, D.C.)

Nov. 1-3 — Industrial Management Society. 14th Annual Management Engineering Clinic, Sheraton Hotel, Chicago. (Lewis M. Glassner, vice-president, public relations, I.M.S., 35 East Wacker Dr., Chicago 1.)

Nov. 2-3—Third Annual Metals Casting Conference, Purdue Campus, Lafayette, Ind. Sponsored by Purdue University and American Foundrymen's Society, Michiana and Central Indiana Chapters. (Purdue News Service, Lafayette, Ind.)

Nov. 2-3—Eighth Annual Pittsburgh X-Ray and Electron Diffraction Conference, Mellon Institute for Industrial Research, Pittsburgh. (Leroy E. Alexander, general chairman of conference, c/o Mellon Institute, Pittsburgh 13.)

Nov. 9-11—Steel Founders' Society of America. Annual Technical and Operating Conference, Carter Hotel, Cleveland. (S.F.A., 920 Midland Bldg., Cleveland 15.)

Nov. 10—American Iron and Steel Institute. Regional Technical Meeting, Hotel Mark Hopkins, San Francisco. (George S. Rose, secretary, A.I.S.I., 350 Fifth Ave.,

Rensselaer Gives Evening Courses for Master's

A program of evening study which will earn graduate engineers master's degrees in metallurgy within five or seven college terms, is announced by Wendell F. Hess, head of metallurgy at Rensselaer Polytechnic Institute, Troy, N. Y. The longer period includes two terms of preparatory work by engineers who are not bachelors in metallurgy.

The program of study, requiring from two to three hours of work on two nights of each week, has been approved by industrial executives and engineering associations. More than 40 engineers within motoring distance of the Institute enrolled for the first term's work which began on Sept. 18.

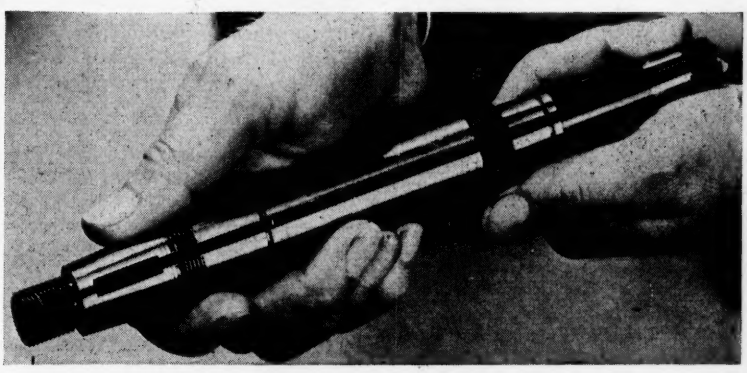
While extension students have often won master's degrees in science or engineering on a hit or miss basis of study over an extended period, it is believed the metallurgical program is the first offering the wide variety of required courses within a specific time.

Offers Russian Translations

Consultants Bureau, 152 West 42nd St., New York 1, has announced that it will provide copies of the English translation of any article from the *Journal of General Chemistry of the USSR*, at $5.00 per article, and from the *Journal of Applied Chemistry of the USSR*, at $7.50 per article.

All 1949 issues of the *Journal of General Chemistry* are already translated and published in English, as well as the January and February, 1950, issues of both the *Journal of General* and the *Journal of Applied Chemistry of the USSR.*

Annual subscription rate to the complete English translation of the *Journal of General Chemistry* is $95, to the *Journal of Applied Chemistry of the USSR* is $80.



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Solar Research Director Dies

John C. Southard, director of research for Solar Aircraft Co., San Diego, California, died September 4 at the age of 43.

Dr. Southard was serving his first year on the N.A.C.A. subcommittee on aircraft structural materials, and was actively associated with the A.S.M., A.I.M.E., A.P.S., A.W.S., A.S.T.M., A.C.S. and Electrochemical Society. Author of 18 technical papers, he contributed chapters of text and illustrations to the recently published book in the Pitman Metallurgy Series, *Titanium in Steel.*

Dr. Southard came to Solar in 1946 from the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., where he had been chief process metallurgist. His Ph.D. in Physical Chemistry was from Johns Hopkins University; his B.S. from Baldwin Wallace College.

F. E. Bash

Francis Edwin Bash, metallurgical engineer and vice-president in charge of the technical department of Driver-Harris Co., Harrison, N. J., died Sept. 14 after a week's illness. He was 57.

Mr. Bash received his B. S. degree from the University of Wisconsin's metallurgical department in 1916, and his chemical engineering degree in 1919. He previously had studied at the University of Washington.

He started his career with Leeds & Northrup Co., and in 1923 went with the technical department of the Electrical Alloy Co. of Morristown, N. J., which was absorbed by Driver-Harris in 1925. He started in the technical department at Driver-Harris and worked up to his present position.

Mr. Bash was known throughout this country and abroad for his experiments and metallurgical developments during the past 25 years. During World War I he succeeded in reproducing the German alloys constantan and manganin when the war cut off foreign supplies. He has promoted the establishment of standardized testing and development procedures for electrical heating, resistance, and other high alloys.

Add Metallurgy Curriculum

University of Maryland has announced the organization of a department of metallurgy to meet needs in the state and in the Washington, D. C., area. At present a metallurgical option in chemical engineering is available, which in two years time will be supplanted by a metallurgy curriculum leading to undergraduate and graduate degrees in metallurgy.

Eugene P. Klier of the department of chemical engineering is in charge of organizing the new department.

Worcester Chapter's New Officers

At the Annual Meeting of the Worcester Chapter A.S.M. Last Spring Were (Left to Right): Gordon T. Rideout, Chief Field Test Engineer, Norton Co., Who Spoke on "Abrasive Applications"; J. Walter Gulliksen of Worcester Pressed Steel Co., Newly Elected Vice-Chairman; and Robert S. Morrow of George F. Blake, Inc., Chairman. (Reported by C. Weston Russell, who starts his tenth term as public relations director)
Photograph Courtesy of Worcester *Telegram-Gazette*

New Films

Malleable Iron

The first motion picture telling the story of malleable iron, "This Moving World", sponsored by the Malleable Founders' Society, is available free of charge from Association Films, Inc. The three-reel 16-mm. technicolor film shows how the metal is made, tested and used. Edwin C. Hill, popular radio commentator, is the narrator.

The film may be borrowed from any one of the following Association Films exchanges: New York—35 W. 45th St.; Chicago—206 So. Michigan Ave.; San Francisco—351 Turk St.; and Dallas—1915 Live Oak St.

Gating of Castings

The Naval Research Laboratory now has available for loan a fourth film in its current series. Entitled "Choke Control in Finger Gating", by W. H. Johnson, it deals with the gating of castings. It is a 16-mm. sound Kodachrome film. Arrangements for presentation at A.S.M. chapters should be made by request to the Laboratory, attention of Code 3500, Dr. O. T. Marzke, superintendent of the metallurgy division.

Film Strips

For use in elementary and high school classes, a series of new industrial film strips has been issued by Young America Films, Inc., 18 East 41st St., New York 17. Included in the new titles are "How We Get Our Aluminum" (44 frames), "How We Get Our Copper" (40 frames), and "How We Get Our Iron and Steel" (38 frames).

The filmstrips are in black and white and are available at $3.50 per print.

FIAT Documents Available

During and after the War, a governmental agency nicknamed FIAT (meaning "Field Information Agency, Technical") accumulated some 50,000 documents relating to German achievements in science. An 88-volume compendium of this information is now being published in English.

While principally devoted to German progress in the years 1939 to 1945 in the fields of biology, chemistry, mathematics, medicine, physics and the earth sciences, many of the documents will be of interest to research metallurgists. They may be located by consulting the free catalog of the titles available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. The catalog is entitled "American FIAT Review of German Science". It is planned to have several sets of complete published work available for limited free loan service.

Lindberg Official in Europe

Cary H. Stevenson, vice-president of Lindberg Engineering Co., has been traveling in Europe to coordinate heat treating equipment sales and manufacturing by Lindberg's associated organizations in England, France and Italy. He is also visiting plants in Holland and Germany.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad, Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio
W. W. Howell, Technical Abstractor
Assisted by Pauline Beinbrech, N. W. Baklanoff, Fred Rothfuss, and Leila M. Virtue

A GENERAL METALLURGICAL

232-A. Chemico's New Pickle Liquor Process. F. J. Bartholomew. *Chemical Engineering,* v. 57, Aug. 1950, p. 118-120.

See abstract of "Acid Salvaging Process Cuts Pickling Costs", *Steel,* item 216-A, 1950. (A8, L12, ST)

233-A. Speedometer Output Upped by Good Production Planning. *Production Engineering & Management,* v. 26, Sept. 1950, p. 57-64.

Miscellaneous fabrication and finishing procedures at AC Spark Plug Co. (A5)

234-A. Severe Investigation Shows Magnesium Logging Wedges Not a Fire Hazard. E. M. Cramer and A. R. Hard. *Light Metal Age,* v. 8, Aug. 1950, p. 10-11, 21.

How this conclusion was reached by the Division of Industrial Research of the State College of Washington. (A7, T3, Mg)

235-A. 1949 Copper Production. *Skillings' Mining Review,* v. 39, Sept. 9, 1950, p. 1, 4.

Production data for the major U. S. companies. (A4, Cu)

236-A. Air Pollution by Industrial Fumes, Gases, and Dusts. Louis C. McCabe. *Mining Engineering,* v. 187, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 187, 1950, p. 971-973.

Quantitative data from a number of metallurgical operations, and allowable discharge in terms of effluent-weight ratio. Typical installations for recovery of stack effluents. (A7)

237-A. What's Ahead in Steelmaking? John D. Knox. *Steel,* v. 127, Sept. 18, 1950, p. 111-113, 136.

Surveys prospects, including taconite development, larger blast furnaces and openhearths, faster continuous galvanizing and tinning of coiled stock, continuous casting, and new extrusion processes. Diagrams and illustrations. (A general, ST)

238-A. More Steel for War and Peace. *Steel,* v. 127, Sept. 18, 1950, p. 114-116.

Trend toward increased steel capacity. (A4, ST)

239-A. National Tube Expansion at Lorain Works. T. J. Ess. *Iron and Steel Engineer,* v. 27, Sept. 1950, p. 36N-58N.

Includes the coke plant, blast furnaces, openhearth, bessemer, rolling mills, and pipe mills. (A5, D general, F general, ST)

240-A. Disposal of Cyanides by Complexation. David Milne. *Sewage and Industrial Wastes,* v. 22, Sept. 1950, p. 1192-1199.

The possibility of safe disposal of cyanide rinse waters by combining with nickel-bearing rinses to form the tightly bound nickelocyanide complex. The theory of complex-forming reactions, and the equilibria existing during operation of the treatment process. (A8)

241-A. The Present Status of Plating-Room Waste Disposal. C. Fred Gurnham and Barnett F. Dodge. *Proceedings of the American Electroplaters' Society,* v. 36, 1949, p. 251-263; discussion, p. 263.

New state and federal programs. Typical plant installations. (A8, L17)

242-A. The New Continuous Brass Mill of the Scovill Manufacturing Company, Waterbury, Conn., U. S. A. J. J. Hoben and J. F. Mulvey. *Journal of the Institute of Metals,* v. 77, July 1950, p. 357-388.

Details of the plant, including melting, continuous casting, rolling, annealing, strip-pickling, slitting and shearing, inspection, and handling equipment and procedures. (A5, C5, Cu)

243-A. The Safe Use of Perchloric-Acetic Electropolishing Baths. Pierre A. Jacquet. *Metal Finishing,* v. 47, Nov. 1949, p. 62-69.

General conditions for this bath which the author has pioneered and recommended since 1931. Summarizes recent research on this subject in France by Medard and Sartorius. 11 ref. (A7, L13)

244-A. (Book) Business. . .Big and Small. . .Built America. 172 pages. 1950. U. S. Steel Corp., 71 Broadway, New York, N. Y.

Statements by officials of U. S. Steel at the Apr. 1950 hearings before the Subcommittee on the Study of Monopoly Power of the House Committee on the Judiciary. Availability of iron ore, research contributions, competition, profits, etc. (A4, ST)

245-A. (Book) Minerals Yearbook 1948. Allan F. Matthews, editor. 1652 pages. 1950. U. S. Government Printing Office, Washington, D. C.

This edition adds statistics on foreign minerals as well as regional and State presentation of domestic data. (A4)

246-A. (Book) Scientific & Technical Cooperation in the American Republics, 1939-1949. 145 pages. 1949. Interdepartmental Committee on Scientific and Cultural Cooperation, Washington, D. C.

Cooperative projects conducted by the U. S. with American Republics, are reported by country. Covers scientific, social, and cultural research; includes metallurgy. (A9)

247-A. (Book) National Physical Laboratory Reports for the Years 1946 and 1947. *His Majesty's Stationery Office,* York House, Kingsway, W. C. 2, England. 76 pages and 58 pages.

Brief outlines of projects and progress in the aerodynamics, electricity, engineering, light, mathematics, metallurgy, metrology, physics, radio, and ship divisions. Includes list of papers published by each division. (A9)

248-A. (Book) Annual Statistical Report. 106 pages. 1949. American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

Statistics relating to the iron and steel industry of the United States and Canada for the year 1949 together with comparable figures for some preceding years. Several new tables are included. One set shows inventory of scrap and pig iron and consumption of those metals by type of furnace for 1946-1949. Another table shows production of electrical sheets and strip, and sheets for enameling. Details covering United States imports and exports of iron and steel products by countries. (A4, Fe, ST, CI)

B RAW MATERIALS AND ORE PREPARATION

252-B. Polarography in Fused Salts. Martin Steinberg and Norman H. Nachtrieb. *Journal of the American Chemical Society,* v. 72, Aug. 1950, p. 3558-3565.

Typical polarographic waves were obtained for reduction of a number of cations at the dropping mercury electrode in a melt of Li, Na, and K nitrates. The Ilkovic equation was found to apply to the reduction of divalent Ni, Pb, Cd and Zn in the ternary nitrate melt at 160° C. Theory of the current-volt-

age relation was experimentally confirmed in the nitrate melt for the above cations. Attempts to operate dropping electrodes of pure Pb and Bi in a molten LiCl-KCl melt were unsuccessful. Dropping molten Ag electrodes gave no useful polarograms in NaCl or borax at 1000° C. Ultimate objective is development of a polarographic technique for study of reactions in metallurgical slags and molten glasses. 20 ref. (B21, S11)

253-B. Effect of Boron Upon the Properties of Steel. *Industrial Heating*, v. 17, Aug. 1950, p. 1348, 1450. Condensed from "Effect of Boron and Kind of Boron Addition Upon the Properties of Steel", R. A. Grange, W. B. Seens, W. S. Holt, and T. M. Garvey.

Previously abstracted from *American Society for Metals*, Preprint No. 5, 1949. See item 3B-196, 1949. (B22, Q27, Q6, J26, ST)

254-B. How Much Iron Ore in Brazil? Part I, II. John Van N. Dorr. *Iron Age*, v. 166, Aug. 17, 1950, p. 81-84; Aug. 24, 1950, p. 79-82.

A report on the basis of a joint long-term study by the Brazilian National Department of Mineral Production and the U. S. Geological Survey. (B10, Fe)

255-B. The Use of the Oxygen Lance in British Electric Furnace Practice. Part I. The Use of Oxygen for the Production of Low-Carbon Alloy Steels Other Than High-Chrome Steels. T. H. Harris and D. J. O. Brandt. **Part II. The Use of Oxygen Lance in Stainless Steel Production.** W. H. Everard and D. J. O. Brandt. *Journal of the Iron and Steel Institute*, v. 165, Aug. 1950, p. 399-418.

Part I: Technique during the boiling-down period and typical results on both high-carbon and low-carbon charges. Effect of oxygen on residual Mn; possible rise in temperature during oxygen injection; lance life. Part II; technique and details of carbon reduction and chromium loss. The physical chemistry; alteration of composition and temperature during oxygen injection. The log sheet of a typical heat is included. 11 ref. (B22, D5, AY, SS)

256-B. Concentration of Iron Ore by Magnetic Roasting. (In French.) V. I. Karmazine. *Centre de Documentation Sidérurgique, Circulaire d' Informations Techniques*, v. 7, Jan.-Feb. 1950, p. 11-31. Translated from *Gornyi Zhurnal* (Mining Journal), v. 120, Nos. 9-10, 1946, p. 28-35.

Method which has been practically applied to several iron deposits of the Donets Basin. It is particularly recommended for quartzite ores. Theoretical bases; flow sheets; equipment. 13 ref. (B15, Fe)

257-B. New Methods and Possibilities in the Metallurgy of Cuprous Roasted Pyrites. (In German.) Friedrich Vogel. *Chemische Technik*, v. 2, May 1950, p. 161-163.

Instead of the older method of chlorination, preliminary removal of the iron from the waste formed during production of H_2SO_4 is recommended. The Fe content of the pyrites is reduced to sponge iron and separated from the desired Cu, Ni, Co, Zn, precious metals, etc., by magnetic separation, carbonyl formation, or solution in mineral acids. Details for pyrites containing other metals besides Cu. (B14, C1, A8, Cu)

258-B. Present and Prospective Sources of Supply of Steelmaking Raw Materials. Part II. C. C. Henning and R. W. Braund. *Blast Furnace and Steel Plant*, v. 38, Aug. 1950, p. 908-911.

Completes survey. 20 ref. (B10, Fe)

259-B. Present and Prospective Sources of Supply of Steelmaking Raw Materials. C. C. Henning and R. W. Braund. *Year Book of the American Iron and Steel Institute*, 1950, p. 251-270; discussion, p. 271-273.

Previously abstracted from *Blast Furnace and Steel Plant*. See items 214-B and 258-B, 1950. (B10, Fe)

260-B. Taconites Are Ready. John V. Beall. *Journal of Metals*, v. 188, Sept. 1950, p. 1087-1088.

Commercial status and plans of various companies for taconite utilization in the near future. One of the factors that makes the mining of taconites economic and feasible is the development of Linde Air Products Co.'s jet-piercing drill. Includes cost analysis. (B12, Fe)

261-B. The Mechanism of Sulphur Transfer Between Carbon-Saturated Iron and CaO-SiO_2-Al_2O_3 Slags. G. Derge, W. O. Philbrook, and Kenneth M. Goldman. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1111-1119.

Shows experimentally that area of the slag-metal interface is a rate-determining factor in the transfer of S from Fe to CaO-Al_2O_3-SiO_2 slags in a carbon-saturated system. Concentration gradients are removed by convection rather than diffusion. The S crosses the interface in chemical combination with Fe which is later reduced to pellets, accompanied by evolution of CO and formation of a stable Ca-S compound in the slag. 16 ref. (B21, Fe)

262-B. The Use of Spiral Classifiers as Ball Mill Feeders. T. C. King. *Mining Engineering*, v. 187, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 187, 1950, p. 951.

Practice at new Graham-Central Mill of Eagle-Picher, near Galena, Ill. (B13)

263-B. Flotation of Residues From the Wimmera Dump, Stawell, Vic. K. S. Blaskett and H. H. Dunkin. *Council for Scientific and Industrial Research and the University of Melbourne Metallurgy Department*, Joint Investigation No. 335, Oct. 26, 1948, 2 pages.

The recovery of gold. (B14, Au)

264-B. Concentration of Tin Ore From Ardlethan, N.S.W. K. S. Blaskett and H. H. Dunkin. *Commonwealth Scientific and Industrial Research Organization and the University of Melbourne Metallurgy Department*, Joint Investigation No. 374, Dec. 22, 1949, 6 pages.

Procedure for investigating the concentration problem. (B14, Sn)

265-B. Cyanidation, Settlement and Filtration of a Sample From the Black Horse Dump, Egerton, Victoria. K. S. Blaskett and H. H. Dunkin. *Commonwealth Scientific and Industrial Research Organization and the University of Melbourne, Metallurgy Department*, Joint Investigation No. 380, Jan. 4, 1950, 4 pages.

Investigation of the above for gold. (B14, Au)

266-B. Decrease of Concentration of Phosphorus in High-Manganese Flux During Its Melting in Flame Furnaces. (In Russian) M. M. Timofeev and A. G. Minakov. *Avtogennoe Delo* (Welding), v. 21, June 1950, p. 23-24.

Experimental investigation of conditions of production of high-Mn fluxes reveals the possibility of introducing cast iron into the furnace to decrease the P content of fluxes from 0.15 to 0.09%, i.e., 40%. Data are tabulated and charted. (B21)

267-B. Fundamental Factors Influencing the Strength of Green and Burned Pellets Made From Fine Magnetite-Ore Concentrates. (In Swedish.) P. A. Ilmoni and Magnus Tigerschiöld. *Jernkontorets Annaler*, v. 134, no. 4, 1950, p. 135-171.

Results of laboratory investigations carried out at Mines Experiment Station of the Institute of Technology, Stockholm. By improvements in the balling method it was possible to produce pellets of spherical shape and uniform dimensions. Apparatus by which crushing strength of the green pellets can be measured with good accuracy. A series of runs with pellets made from concentrates of various fineness and different water contents was made. A working hypothesis for the results obtained in the balling operation. Mechanism of the drying and burning operation. 10 ref. (B16, Fe)

268-B. Investigation of Calcined Pyrites Containing Zinc. (In Polish.) **Part II. Agglomeration of Calcined Pyrites by Sintering.** St. Holewinski and Wl. Madej. **Part III. Volatilization of Zinc During Sintering of Calcined Pyrites.** M. Smialowski and J. Niewiadomski. *Prace Badawcze Glownego Instytutu Metalurgii i Odlewnictwa*, v. 2, no. 2, 1950, p. 101-110.

Part II: Sintering tests using the down-draft method on pyrites containing 47.38% Fe and 8.51% Zn. Shows that difficulties in the sintering process are mainly due to small particle size. Satisfactory results were obtained by adding 20% slag from rotary kilns. Part III: Removal of Zn by the down-draft sintering process. Pb and S were largely removed, but the amounts of Zn and As remaining were too large for successful application of the method. (B16, Zn, Fe)

269-B. Blackburn Heavy - Density Plant Opens New Brown Iron Ore Reserves. Alfred M. Shook. *Engineering and Mining Journal*, v. 151, Sept. 1950, p. 78-81.

Treatment plant of Shook and Fletcher Supply Co., at Blackburn mine near Russellville, Ala. Includes flowsheet. (B10, Fe)

270-B. A Glossary of Uranium- and Thorium-Bearing Minerals. Judith Weiss Frondel and Michael Fleischer. *U. S. Geological Survey*, Circular 74, Apr. 1950, 20 pages.

(B10, A10, U, Th)

271-B. Summary Account of Canadian Uranium Deposits. A. H. Lang. *Canadian Mining and Metallurgical Bulletin*, v. 43, Aug. 1950, p. 426-433; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 53, p. 289-296.

16 references. (B10, U)

272-B. Possibilities and Limitations of Gravity Concentration as Applied to Pitchblende Ores at Port Radium, N.W.T. E. B. Spice. *Canadian Mining and Metallurgical Bulletin*, v. 43, Aug. 1950, p. 446-449; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 53, p. 309-312.

Ore characteristics, present concentration flowsheet, and future prospects. (B14, U)

273-B. The Radiogenic Concentration of Uranium Ores. L. A. Kaufman. *Canadian Mining and Metallurgical Bulletin*, v. 43, Aug. 1950, p. 450-453; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 53, p. 313-316.

"Electronic" concentrator developed by Canadian Bureau of Mines and Eldorado Mining and Refining Co. Separation is based on response of a Geiger counter, since relationship between Geiger count and U_3O_8 content is approximately linear for the same size pieces of ore. Jig concentrate ¼ to 1 in. moves in "single file" along a 2-in. belt past

the Geiger tube. If the lump is sufficiently active, a "kicker" is activated, wnich knocks the piece of ore off the belt into a chute. (B14, U)

274-B. Concentration and Extraction of Uranium From Several Types of Canadian Ores. *Canadian Mining and Metallurgical Bulletin,* v. 43, Aug. 1950, p. 454-460; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 53, p. 317-323.

Paper by staff of Radioactivity Division, Mines Branch, Department of Mines and Technical Surveys, Ottawa, Canada. Tables, flow diagrams, radiographs, and micrographs. (B14, U)

275-B. Recent Progress in Refractories. V. Aluminio-Silicates. VI. Carbon. VII. Super-Refractories. J. H. Chesters. *Ceramic Age,* v. 56, Aug. 1950, p. 24, 26-27; Sept. 1950, p. 16-17.

Developments and applications to industry. (B19)

276-B. (Book) Refractories. James R. Coxey. 162 pages. 1950. Pennsylvania State College, State College, Pa. $2.50.

A textbook designed to provide a practical background in refractories for operating plant personnel, engineers, and metallurgists. Properties, classification, manufacture, and testing of refractories. Analysis of the various types of refractories, as they apply to the glass, metallurgical, lime and cement, and other industries. (B19)

C

NONFERROUS EXTRACTION AND REFINING

122-C. Semi-Rotary Furnaces; Efficient Melting Units for Non-Ferrous Metals. *Metal Industry,* v. 77, Aug. 11, 1950, p. 90.

Construction of furnace. Heating is provided by oil fuel burners or gas injectors. Furnaces are said to be efficient and economical for bronze, gunmetal, copper, light alloys, etc. (C21, Cu, Al)

123-C. Milestones in the Non-Ferrous Metallurgical Industry. W. H. Dennis. *Mine & Quarry Engineering,* v. 16, Sept. 1950, p. 292-293.

Pyrometallurgy, electrometallurgy, hydrometallurgy, and ore dressing. (C general, B general, EG-a)

124-C. The Action of Sulphide Ion and of Metal Salts on the Dissolution of Gold in Cyanide Solutions. C. G. Fink and G. L. Putnam. *Mining Engineering,* v. 187, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 187, 1950, p. 952-955.

Above was studied by determining the time required for the solvents to dissolve gold leaf. Minute traces, even 0.5 ppm., of sulfide ion retard tne dissolution of gold. On the other hand, traces of the salts of Pb, Bi, Hg, and Tl considerably accelerate the dissolution. The beneficial effect of Pb is dependent upon pH and cyanide-ion concentration. (C24, Au)

125-C. Reduction in Oxygen of Cr_2O_3 by Hydrogen in a Solar Furnace. (In French.) Félix Trombe and Marc Föex. *Comptes Rendus* (France), v. 230, June 26, 1950, p. 2294-2296.

Laboratory technique, indicating theoretical bases of the reaction. Cr obtained was of a high degree of purity (99.99%). The apparatus may be used for other treatments under different conditions and atmospheres. (C2, Cr)

126-C. Electrode Potentials and Electroconductivity of Solutions During Electrolytic Production of Manganese. (In Russian.) I. Ya. Garkavi and V. V. Stender. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, June 1950, p. 599-606.

Experimentally investigated for different temperatures and different compositions of electrolyte. Logarithmic dependence of anodic and cathodic potentials on current density. Behavior of pure Pb alloy and Pb containing 1% Ag as anodes. 21 ref. (C23, Mn)

127-C. Electrolytic Production of Highly Dispersed Porous Lead. (In Russian.) N. T. Kudryavtsev and E. A. Tereshkovich. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, June 1950, p. 607-612.

Investigation of conditions for the electrodeposition of Pb on the cathode in spongy form established relations between composition of electrolyte and maximum safe current densities on cathode and anode at different temperatures. An excess of soda in the electrolyte passivates the anode while glycerine activates it. 15 ref. (C23, Pb)

128-C. Conductivity of Molten Cryolite Baths for Electrolytic Production of Aluminium. (In Italian.) A. Vayna. *Alluminio,* v. 19, no. 3, 1950, p. 215-224.

Physical principles and practical methods for measurement of bath conductivity. Results of numerous determinations on binary and ternary mixtures at different temperatures. Influence of changes in electrical conductivity on thermal equilibrium of the cells. (C23, Al)

129-C. Electrolytic Production of Manganese. (In Swedish.) Bengt Sandberg. *Jernkontorets Annaler,* v. 134, no. 4, 1950, p. 172-188.

Literature review. 69 ref. (C23, Mn)

130-C. Investigation of Electrodeposition of Manganese. Part II. (In Polish.) M. Perec. *Prace Badawcze Glownego Instytutu Metalurgii i Odlewnictwa,* v. 2, no. 2, 1950, p. 93-99.

131-C. Applications of Amalgam Metallurgy. H. Hohn. *Research,* v. 3, Sept. 1950, p. 407-417.

Various selected techniques as follows: example of a filtration process: extraction of aluminum from AlFeSi; extraction of metallic sodium; a special case of the alkali-chloride electrolysis process; example of semi-electrolysis; processing Zn-alloy scrap; example of blocking electrolysis; extraction of Zn of 99.999% purity from the purple ore; example of indirect amalgam electrolysis; extraction of electrolytic lead from low-grade Zn ores; example of a concentration transforming process; extraction of rare Zn satellites; example of a continuous process for separation of multimetallic mixtures by means of a progressive phase exchange based on complex potentials; alkaline-processing of rotary kiln oxides; and example of dry evaporation process. (C29, B14, EG-a)

D

FERROUS REDUCTION AND REFINING

227-D. Dehumidification of Air for Dry Blast. John Everetts, Jr. *Industrial Heating,* v. 17, Aug. 1950, p. 1370, 1372, 1374, 1376, 1378. (A condensation.)

Four general methods of removing moisture from blast furnace air; their advantages and disadvantages. (D1)

228-D. Cottrell Electrical Precipitation Equipment in the Process Industries. N. W. Sultzer. *American Society of Mechanical Engineers,* Paper No. 50-PRI-15, 1950, 4 pages.

Equipment in general, principles involved in its operation, and applications in the pulp and paper industry, carbon black industry, phosphorus industry, and the iron and steel industry for cleaning furnace gas. (D general)

229-D. Theoretical Considerations in the Operation of Iron Blast Furnaces With Cold Oxygen Carbon-Dioxide Blast. William Bleloch. *Journal of the Chemical, Metallurgical & Mining Society of South Africa,* v. 50, May 1950, p. 255-291; discussion, p. 291-292.

The systems Fe-C-O_2 and C-O_2 are discussed in order to evaluate the feasibility of using a cold or regenerated blast composed of not less than 95% by weight of O_2 and CO_2, for operation of iron blast furnaces with coke or anthracite. Concerned essentially with the reduction of iron oxides to pig iron. Reduction of other elements such as Cr and V is also considered. Hematite smelting at high top pressure. (D1, Fe)

230-D. Improvement of Heat Exchange in a Cowper Stove by Modification of the Smoke-Exhaust System. (In French.) M. Boissin. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 7, Jan.-Feb. 1950, p. 39-50.

Theoretical and experimental data indicate that heat exchange may be improved by proper modification of the exhaust system. (D1, Fe)

231-D. Preliminary Desulfurization in Steelmaking in the Basic Electric Furnace. (In Italian.) R. Zoja and P. Raffo. *Metallurgia Italiana,* v. 42, May 1950, p. 173-174.

Procedure for desulfurizing the steel prior to oxidation, using the reducing slag from the previous melt. (D5, ST)

232-D. Oxygen Technique Salvages Stainless Steel Scrap. *Steel,* v. 127, Aug. 28, 1950, p. 87-88.

Use by English electric steelmakers during meltdown period to utilize alloy scrap which arises during conversion. (D5, B22, A8, SS)

233-D. The Practice of Bottom Pouring Steel. Part II. (Concluded.) Charles R. Funk. *Blast Furnace and Steel Plant,* v. 38, Aug. 1950, p. 899-907.

The various materials used in the assembly, the assembly itself, and methods of assembly to assure optimum cleanliness of metal with no break-outs during pouring. (D9, ST)

234-D. Blast Furnace Tuyere Designed To Deliver Air as Required. John H. Sprow. *Blast Furnace and Steel Plant,* v. 38, Aug. 1950, p. 928-929.

"Combination tuyere" designed to improve air distribution in large blast furnaces. The small-diameter segments concentrate a portion of the blast, forcing it to penetrate farther toward the center than it would normally go through a large tuyere; and the large-diameter segments spread a portion of the blast farther than it would go through a small tuyere. (D1)

235-D. Changing Practice: Its Effect on Open Hearth Output. William Schwinn. *Journal of Metals,* v. 188, Sept. 1950, p. 1089.

Summarizes operating data obtained since June 1949 at Keystone Steel & Wire Co., Peoria, Ill. (D2, ST)

236-D. Rapid Desulphurization; Treatment of Open-Hearth Metal With Liquid Slag. Alejandro Gimenez y Sanmartin. *Iron and Steel*, v. 23, Aug. 1950, p. 352-354. Translated and condensed from *Oyna* (Spanish), no. 4, Apr. 1949.

Influence of slag in steelmaking and the possibilities of the Perrin process. The rapid and appreciable desulfurization of openhearth steel by contact with a liquid slag previously put in the pouring ladle. (D2, ST)

237-D. Several Means of Increasing the Wear Resistance of Open-Hearth Furnaces and Improving Their Operation. (In Russian.) P. P. Budnikov, D. P. Bogatskii, A. A. Lebed'kov, and Ya. L. Rozenblit. *Izvestiya Akademii Nauk SSSR* (Bulletin of the Academy of Sciences of the USSR), Section of Technical Sciences, June 1950, p. 901-913.

Status of refractories for steelmelting furnaces was surveyed. Critical evaluation and theories concerning best use of these materials. Optimum design of openhearth furnaces on the basis of observations and production figures. (D2)

238-D. Further Investigations on the Solidification of Rimming-Steel Ingots. (In Swedish.) A. Hultgren, G. Phragmén, S. Wohlfahrt, and J. E. Ostberg. *Jernkontorets Annaler*, v. 134, no. 5, 1950, p. 189-221.

Results of an extensive study, including numerous macrographs showing blowhole distribution and macrostructure under various conditions. Effects of application of pressure during solidification were investigated for several compositions. Use of a lid, with a casting orifice, was also investigated. (D9, M28, ST)

239-D. Synthetic Pig Iron Made From Steel Scrap in a Charcoal-Fired Cupola Furnace. (In Polish.) M. Czyzewski. *Prace Badawcze Glownego Instytutu Metalurgii i Odlewnictwa*, v. 2, no. 2, 1950, p. 123-136.

Details of experimental work on above process. Includes furnace diagrams and photomicrographs. 11 ref. (D8, A8, CI)

240-D. Slag Composition and Removal of Impurities in the Basic Openhearth Process; Statistical Analysis. (In Polish.) E. Bucko. *Prace Badawcze Glownego Instytutu Metalurgii i Odlewnictwa*, v. 2, no. 2, 1950, p. 137-167.

Results of chemical analysis of basic slags from 44 heats, from openhearths of 20-50 ton capacity, working on cold charges, were subjected to statistical analysis. 13 ref. (D2, ST)

241-D. How To Choose Blast Furnace Refractories. R. P. Heuer and C. E. Grigsby. *Steel*, v. 127, Sept. 4, 1950, p. 99-100, 102, 104; Sept. 11, 1950, p. 100, 102, 105; Sept. 18, 1950, p. 126, 128, 131, 134.

Development of blast furnaces and their refractories from primitive to modern types. Recommendations for selection of refractories. (D1, Fe)

242-D. Inductive Stirring in Arc Furnaces. Sven Fornander and Folke Nilsson. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 46-66; discussion, p. 66-69.

Previously abstracted from *Journal of Metals*. See item 30-D, 1950. (D5, ST)

243-D. Obtaining Uniform Bath Composition by Reladling. J. J. Green. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 69-70; discussion, p. 70.

Previously abstracted from *Journal of Metals*. See item 8-D, 1950. (D9, SS)

244-D. Stirring With Neutral Gas. J. H. Kennedy. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 71; discussion, p. 71-72.

Disadvantages of stirring with argon gas and metallic calcium as compared with reladling stainless steel to obtain uniformity in analysis. Emphasizes need for a cheap and efficient method. (D5, D9, SS)

245-D. Paddle and Mixing Ball. W. M. Patterson. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 72; discussion, p. 72-74.

Stirring procedure at Allegheny Ludlum Steel Corp., Brackenridge, Pa. (D5, ST)

246-D. Optimelt Automatic Recalibrating Control for Arc-Furnace Regulators. R. M. Bayle. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 129-138; discussion, p. 142-155.

Previously abstracted from *Journal of Metals*. See item 16B-117, 1949. (D5)

247-D. Results of Optimum Current Control on Electric Furnaces. L. A. Wynd. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 139-142; discussion, p. 142-155.

Previously abstracted from *Journal of Metals*. See item 9-D, 1950. (D5)

248-D. Thermal Gradients and Strains During Rapid Cooling of Graphite Electrodes. H. G. MacPherson. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 177-184.

Previously abstracted from "Graphite Electrodes", *Journal of Metals*, item 154-T, 1950. (D5, T5, ST, C)

249-D. Deoxidation of Low-Carbon Rimming and Semikilled Steels Melted in 70-Ton Basic Electric Furnaces. W. W. Black. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 188-190.

Effect of FeO and temperature at tap and of carbon reduction on mold action. Effects of cold pig additions on additions of Al. (D5, ST)

250-D. Manufacture of Rimming Steel in Small Electric Furnaces. A. J. Texter. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 190-191.

Furnace, heat, use of ingot molds as stools, and control in the mold at the Firth-Sterling Steel and Carbide Corp. (D5, ST)

251-D. Deoxidation Practice on Rimmed and Semi-killed Steels by Steel Company of Canada. A. K. Moore. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 192-194.

Points out differences required from openhearth practice. (D5, ST)

252-D. Deoxidation Practice on Rimmed and Semi-killed Steels. C. H. Weimer. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 195-196.

Charge and tap temperatures used at the Copperweld Steel Co. (D5, ST)

253-D. Deoxidation Practice for Single-Slag Electric-Furnace Rimming Steel. J. R. Atkinson. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 196.

Dependence of oxygen in bath on carbon content, temperature, and oxidizing potential of the slag. Practice at the Dominion Foundries and Steel, Ltd., Hamilton, Ont. (D5, ST)

254-D. Sillimanite Roof Refractories in Basic Electric Furnaces. R. E. Wolfensperger. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 197-202; discussion, p. 202-205.

Actual performance tests comparing the use of four different brands of sillimanite refractories, the principal minerals being sillimanite, andalusite, and kyanite. (D5)

255-D. Bottom and Pouring Refractories. L. L. Wells, Jr. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 206-209; discussion, p. 209-211.

Recent developments in hearth construction, and current trends. Cleanliness problems involved with pouring-pit refractories and results of trials completed at South works, Carnegie-Illinois Steel Corp. (D5, D9)

256-D. Quality of Oxygen-Decarbonized Acid Electric Steel. Charles A. Faist and Clyde Wyman. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 219-235; discussion, p. 235-240.

Investigation of metallurgical factors affecting quality and affecting the economics of the heat. Concentrations of C, Si, and Mn at meltdown and after oxygen injections; melting rate; charge weight; heat time; power consumption; injection time; oxygen volumetric rate; rates of C, Mn, and Si removal; percentage FeO and MnO in meltdown and final slags; temperature of tap; physical and chemical properties; etc. (D5, ST)

257-D. Techniques Employed in Using Oxygen To Make Carbon Steel for Castings. Charles C. Spencer. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 241-243.

Three methods used by Electric Steel Castings Co., Indianapolis. (D5, B22, ST)

258-D. Ore, Oxygen, and Slag Volume. J. W. Juppenlatz. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 244-245.

Effect of slag volume on results and the use of oxygen for its control. (D5, B22, ST)

259-D. High-Chromium Steel in the Acid Arc Furnace. D. C. Hilty. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 246-251; discussion, p. 251-252.

Temperature observation and effect of high-carbon charge on chromium oxidation. (D5, SS)

260-D. Use of Oxygen in Production of High-Chromium Steels. C. J. Jernstrom. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 252-255; discussion, p. 255-256.

Use at the Cooper Alloy Foundry Co., Arlington, N. J., to utilize more scrap in the arc-furnace melting process for producing stainless steel. (D5, B22, SS)

261-D. Use of Oxygen in Melting Stainless Steel. W. T. Bryan. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 256-266.

Experimental and typical production heats on 20% Cr, 25% Ni grades, and application of experimental data in producing 18% Cr, 8% Ni steel. Results are compared with other published data. Includes tables and graphs. (D5, B22, SS)

262-D. Effect of Melting Practice on Hydrogen. Sam F. Carter. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 267-299; discussion, p. 299-301.

Previously abstracted from *Journal of Metals*. See item 31-D, 1950. (D5, ST, H)

263-D. Flushing Molten Steel With Neutral Gases. C. E. Sims. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 302-312; discussion, p. 312-313.

Experiments conducted with A, He, and N_2 as flushing gases in stainless and alloy steel heats. Resulting elimination of H_2 and porosity. The efficiences of the three gases are about equal; however, in the case of N_2 some dissolves in the bath. (D5, AY, SS, EG-m)

264-D. Information From the Chemical Equation. Charles Locke. *Electric Furnace Steel Conference, Proceedings*, v. 7, 1949, p. 315-322.

The quantitative significance of the chemical equation to steel production in the electric arc furnace. Environment of reaction, heat of reaction, role of chemical thermodynamics, equilibrium constant, activity coefficient, free energy, and speed of reaction. (D5, ST)

265-D. (Book) Electric Furnace Steel Conference, Proceedings. Vol. 7, 1949. 399 pages. 1950. American Institute of Mining and Metallurgical Engineers, 29 W. 39th St., New York 18, N. Y.

Papers on materials handling; temperature and composition measurements; operating improvements; electric-furnace refractories; use of oxygen in electric furnace melting; gases other than oxygen in steel, and chemistry of electric furnace steelmaking. Many pertinent papers are abstracted separately. (D5, ST)

E

FOUNDRY

411-E. Three Furnaces Teem 50-Ton Casting. *Iron Age,* v. 166, Aug. 24, 1950, p. 78.

Procedure for casting steel part for a hydro-electric turbine at Falk Corp., Milwaukee. (E23, CI)

412-E. Moulding Sands. *Foundry Trade Journal,* v. 89, Aug. 10, 1950, p. 141.

Compares extent of bonding of British sands to those used in other parts of the world. Discusses whether molding machines should be made to match sands or sands compounded to suit the machine. (E18)

413-E. Castings for Contractors' Plant. A. Graham Thomson. *Foundry Trade Journal,* v. 89, Aug. 10, 1950, p. 143-147.

Foundry layout, exacting tests, types of castings, melting plant, sand system, core shop, patternshop, quality control, personnel, and working conditions at Winget, Ltd., Rochester, England. All castings are produced in Meehanite iron. (E11, CI)

414-E. Investment Casting; The Importance of Correct Design. T. F. Frangos. *Metal Industry,* v. 77, Aug. 11, 1950, p. 83-84, 86.

General discussion. (E15)

415-E. 24 Ways To Avoid Trouble in Die Casting Design. Part One. Hiram K. Barton. *Die Castings,* v. 8, Sept. 1950, p. 24-26, 58.

Diagrams. (To be continued.) (E13)

416-E. Special-Purpose Units To Produce Purse Frame Die Castings. E. I. Valyi. *Die Castings,* v. 8, Sept. 1950, p. 28-30.

Zn alloy rivets and knobs are used. (E13, Zn)

417-E. That Porosity Problem. *Die Castings,* v. 8, Sept. 1950, p. 36-38.

How use of a Zn die casting instead of a precision bronze casting for the valve body in the solenoid-operated air valve used in resistance welders resulted in 60% reduction in machining costs; 84% reduction in cost of materials; 100% increase in life of the air valve; and an airtight, non-warping, and non-shrinking casting. (E13, T7, Zn)

418-E. A Method for Studying Mold-Metal Interface Reactions. Robert E. Savage and Howard F. Taylor. *Foundry,* v. 78, Sept. 1950, p. 82-89.

A method in which a steel pin is melted while embedded in a standard sand test specimen. The method is said to reproduce actual operating conditions and permits determination of the effect of numerous variations in sand mixtures and metal composition. Apparatus and test results. Data for Armco iron and several carbon steels. (E21, Fe, CI)

419-E. Diesel Engine Crankshafts Cast in Gray Iron. Alexander Finlayson. *Foundry,* v. 78, Aug. 1950, p. 70-75, 150-152, 154; Sept. 1950, p. 92-97, 216-218, 220.

Foundry practice of Pacific Car & Foundry Co. in producing cast crankshafts weighing 500-5000 lb. and 6018 ft. long. (E11, T25, CI)

420-E. Navy Modernizes Foundry. Edwin Bremer. *Foundry,* v. 78, Sept. 1950, p. 98-101.

Modernization of the steel foundry of the Naval Gun Factory, Washington. (E general, CI)

421-E. The Pressurized Cupola. *Foundry,* v. 78, Sept. 1950, p. 127.

A windbox equipped with a circular orifice ring designed to solve the problem of uniform distribution of air through the cupola charge. (E10)

422-E. Tin Segregation in Bronzes. Walter Chretien-Horand. *Foundry,* v. 78, Sept. 1950, p. 136.

Solidification and calculation of percentage of melt and crystals at 792° C. for various compositions. Practical application. (E25, Cu)

423-E. Aluminum Core Boxes Better and Cheaper. Franz Schumacher. *Iron Age,* v. 166, Sept. 7, 1950, p. 104-105.

Claims that accurate Al core boxes can now be produced at lower cost than those made of wood. By this new method, foundries can greatly reduce overall coremaking costs, storage, and handling. (E21, T5, Al)

424-E. Surface Finish of Zinc-Base Diecastings. R. L. Wilcox. *Plating,* v. 37, Sept. 1950, p. 934-937, 953.

Information originally prepared as a manual for instruction and guidance of die-casting machine operators. Factors influencing the production of sound die castings with good surface finish. (E13, Zn)

425-E. The Croning Process. *Western Machinery and Steel World,* v. 41, Aug. 1950, p. 62-63.

New process for producing foundry mold and cores using a Bakelite phenolic resin-binder. (E18)

426-E. Casting Accurate Production Bronze. James Corcoran. *Western Machinery and Steel World,* v. 41, Aug. 1950, p. 74-75.

Production of brass and bronze castings at Acra-Cast Foundries in Southern California. (E11, Cu)

427-E. Magnesium Foundry Practice in Canada. M. W. Martinson and J. W. Meier. *Canadian Metals,* v. 13, Aug. 1950, p. 10-13, 40-42, 50.

Previously abstracted from *American Foundrymen's Society,* Preprint 50-44, 1950. See item 195-E, 1950. (E general, Mg)

428-E. High Standards in Mass Production Foundry. G. L. White. *Canadian Metals,* v. 13, Aug. 1950, p. 16-19, 47.

Ferrous foundry of Massey-Harris Co., Canada. (E general, CI)

429-E. The Casting of Metals in Permanent Molds. G. G. M. Carr-Harris. *Canadian Metals,* v. 13, Aug. 1950, p. 26, 28-29, 44-46.

Reviews the process; includes bibliography. 49 ref. (E12)

430-E. Steel Casting Production; A Survey of the Methods Employed by Leyland Motors, Ltd. *Automobile Engineer,* v. 40, Aug. 1950, p. 278-280. (E general, CI)

431-E. The Staveley Iron and Chemical Co., Ltd. *Iron and Steel,* v. 23, Aug. 1950, p. 349-351.

Plant includes centrifugal casting, sand casting, blast furnaces, coke ovens, etc. (E11, E14, D1)

432-E. A Modern Foundry; The Penistone Works of the David Brown Foundries Company. *Metal Industry,* v. 77, Aug. 18, 1950, p. 99-101.

Equipment and procedures of British foundry for ferrous and nonferrous work. (E general)

433-E. Internal Porosity in Grey Cast Iron. A. A. Timmins. *British Cast Iron Research Association Journal of Research and Development,* v. 3, Aug. 1950, p. 449-463; discussion, p. 476-498.

Shrinkage defects were studied for a wide range of metal compositions. (E25, CI)

434-E. Solid Contraction and Fluid Shrinkage in Cast Iron With Special Reference to Heavy Castings. E. Longden. *British Cast Iron Research Association Journal of Research and Development,* v. 3, Aug. 1950, p. 465-475; discussion, p. 476-498.

Material contributing to a fuller understanding of the steps necessary to control the incidence of fluid shrinkage and solid contraction in iron castings is selected from previous papers. Specific examples. (E25, CI)

435-E. Air-Setting Core Paste. *Foundry Trade Journal,* v. 89, Aug. 17, 1950, p. 173-174.

Experiments with several mixes which resulted in selection of a paste containing 57% of a proprietary clay and 43% commercial sodium silicate. Good results were obtained in the laboratory and in practice. (E21)

436-E. Casting Fluidity of Metals. *Foundry Trade Journal,* v. 89, Aug. 17, 1950, p. 175-178.

Joint discussion of "The Fluidity of Steel", J. E. Worthington; and "Effect of Liquid-Metal Properties on the Casting Fluidity of Alloys", V. Kondic. See items 386-E and 318-E, 1950. (E25)

437-E. Aluminum-Alloy Castings. *Foundry Trade Journal,* v. 89, Aug. 24, 1950, p. 201-205. Based upon "Aluminium-Alloy Castings—A Review of British Achievement" by Frank Hudson.

Emphasizes the value of "Y" alloy (4% Cu, 2% Ni, 1.5% Mg, rest Al) for internal-combustion-engine pistons and other engineering components operated at elevated temperatures. (E general, Al)

438-E. The "Abreuvage" Defect. *Foundry Trade Journal,* v. 89, Aug. 24, 1950, p. 215-216. Based on article in *Journal d'Information Techniques des Industries de la Fonderie.*

"Abreuvage" is defined as penetration of the metal by capillary action into the spaces between the grains of sand in the core. It can be due to physical causes, more or less connected with refractoriness, or mechanical causes. Causes and their remedies. (E21)

439-E. Carbon Control of Cupola-Melted Irons. E. Bramble. *Foundry Trade Journal,* v. 89, Aug. 24, 1950, p. 217-218.

Principal factors affecting carbon constant. Recommendations. (E10, CI)

440-E. Production of Impermeable Pieces of Cast Iron. (In French.) Etienne Doat. *Fonderie,* May 1950, p. 2056-2058.

Investigated particularly for gas containers under high pressure. Factors involved, such as composition, method of casting, conditions of cooling, type of mold, etc. (E11, T26, CI)

441-E. Refining of A-S 13 Alloy (Alpax). (In French.) Jean Duport and

Gustave Caminade. *Fonderie,* June 1950, p. 2094-2097.

Methods and technique for refining the above Al alloy (13% Si). Comparative data and micrographs. (E25, Al)

442-E. Crystallization of Cast Iron With Nodular Graphite. (In Russian.) K. P. Bunin and G. I. Ivantsov. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, June 21, 1950, p. 1051-1053.

Investigated for cast iron containing 3.5-3.7% C and 2.2-2.5% Si, modified by an electronic method described by Mil'man (*Vestnik Mashinostroeniya,* No. 12, 1949). Factors influencing the formation of nodular graphite—in particular, Si content. (E25, CI)

443-E. Surface Quality of Zinc Die Castings. James L. Erickson. *Metal Finishing,* v. 47, May 1949, p. 72-74.

Defects which lead to premature corrosion of the plated parts (automotive hardware.) Recommendations for proper selection and use of die lubricants. 14 ref. (E13, L17, Zn)

444-E. A Laboratory Arc-Furnace for Melting Alloys Containing the Refractory Transition Metals. G. A. Geach and D. Summers-Smith. *Metallurgia,* v. 42, Aug. 1950, p. 153-156.

Reviews literature on such furnaces. Furnace developed in laboratories of Associated Electrical Industries in England. 11 ref. (E10, EG-d)

445-E. Basic Principles of Die Design; Cores and Core Mechanisms. H. K. Barton and L. C. Barton. *Machinery* (London), v. 77, Aug. 31, 1950, p. 268-274.

Refers to die-casting dies. 18 schematic diagrams. (E13)

446-E. The "Metallurgical Blast Cupola". Robert Doat. *Foundry Trade Journal,* v. 89, Aug. 31, 1950, p. 229-232; discussion, p. 227. Translated from paper presented to Italian Metallurgical Association.

Installation in use by Compagnie Générale des Conduites d'Eau, Liege, Belgium, for production of cast iron from small steel scrap. This cupola, which includes a dust collector and recuperators, is capable of refining the charge to produce practically any iron desired. It differs greatly from the ordinary cupola in that refining, as well as melting, takes place. Operating data are charted. (E10, CI)

447-E. (Book) **Foundry Sand Control.** W. Davies. United Steel Companies, Ltd., 17 Westbourne Rd., Sheffield 10, England. 30s. plus postage.

The nature of silica and the clays. Approach from the standpoint of the geologist. Strength of molding sands, the mold surface, the foundry-sand system, selection of foundry sands, selection of bonding clays, and the future of foundry control. (E18)

448-E. (Book) **Handbook on Designing for Quantity Production. Ed. 2.** Herbert Chase. 564 pages. McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. $7.50.

Substantially rewritten, with a considerable amount of new material added. Design of die castings, sand castings, permanent-mold castings, screw-machine products, stampings, impact extrusions, die-forged parts, hot heading, cold heading, wire forms, powder-metal parts, and plastic moldings. Merits of the various processes from the standpoints of cost and productivity. (E general, F general, G general, H general)

F

PRIMARY MECHANICAL WORKING

196-F. Welding Tubes. *Welding Journal,* v. 29, Aug. 1950, p. 657-659.

Procedures and equipment for forming and electric welding of large steel pipe at National Tube Co. (F26, CN)

197-F. Design of Forgings. *American Machinist,* v. 94, Aug. 21, 1950, p. 139, 141.

Described and diagrammed. (F22)

198-F. The Forging of Steel Anchor Chain. C. D. Linnenbank. *Steel Processing,* v. 36, Aug. 1950, p. 392-397. (F22, T7, AY)

199-F. Fundamentals of the Working of Metals. Part XIV. General Classification of Forming Methods. George Sachs. *Modern Industrial Press,* v. 12, Aug. 1950, p. 6, 8, 42.

Includes consideration of stress distribution. (F general, G general)

200-F. Flame-Upsetting Makes Spool Studs. L. A. Gladu. *Welding Engineer,* v. 35, Sept. 1950, p. 42.

Simple procedure for manufacture of the studs which are used to anchor and separate the cross trees on telephone poles. (F22, J2, T7, CN)

201-F. Aluminum Seamless Tubing. M. F. Cook. *Mechanical Engineering,* v. 72, Sept. 1950, p. 723-726, 732.

Equipment and procedures for production of cold finished Al tubing from an extruded bloom. (F26, Al)

202-F. Huge Froming Dies Simplify Production of Welded Pipe. Ben C. Brosheer. *American Machinist,* v. 94, Sept. 4, 1950, p. 128-129.

Described, diagrammed, and illustrated. (F26, CN)

203-F. Determining Practical Forging Cost. J. J. Sloan and K. R. Denny, *Machine Design,* v. 22, Sept. 1950, p. 151-152.

Several parts which can be made either by die forging or machining. Comparative cost data for the two methods. The direction of the advantage varies with the material, design of the piece, and number of pieces required. (F22, G17)

204-F. Forging Economies Through Die Design. Lester F. Spencer. *Iron Age,* v. 166, Sept. 7, 1950, p. 99-103; Sept. 14, 1950, p. 89-91.

How to simplify die designs in order to achieve balanced-section forgings. These result in low-cost forging operations and simplify subsequent finishing and heat treating. Part II: 30 die steel types and alloy percentages. Reasons for selection and specific applications. (F22)

205-F. NBS Gets New Rolling Mill. *Iron Age,* v. 166, Sept. 7, 1950, p. 111.

New two-high 16 x 24-in. rolling mill at National Bureau of Standards is expected to facilitate greatly the preparation of metallurgical specimens. (F23)

206-F. Rolls and Rolling. Part XVII. Beams. E. E. Brayshaw. *Blast Furnace and Steel Plant,* v. 38, Aug. 1950, p. 917-927.

Roll-pass design for beams. (F23)

207-F. Rail Slitting Mills. C. W. Barrett. *Iron and Steel Engineer,* v. 27, Aug. 1950, p. 59-66; discussion, p. 66.

Includes layout and roll-pass diagrams and illustrations. (F29, CN)

208-F. New Blooming, Bar and Billet Mills of Lorain Works. A. F. Eisel. *Iron and Steel Engineer,* v. 27, Aug. 1950, p. 100-107.

Recent developments embodied in new unit. (F23)

209-F. Continuous Wire Drawing; New Barron & Crowther Machine. *Wire Industry,* v. 17, Aug. 1950, p. 657-658.

New development in non-slip wire-drawing machinery. (F28)

210-F. Alloy Steel Sheets. *Iron and Steel,* v. 23, Aug. 1950, p. 339-343.

Rolling of stainless and high speed steel sheets at Samuel Osborn & Co., Ltd., in Britain. (F23, SS, TS)

211-F. Effect of Speed, Temperature, and Kind of Rolls on Spread and Elongation in the Hot Rolling Process. (In Polish.) Z. Wusatowski and R. Wusatowski. *Prace Badawcze Glownego Instytutu Metalurgii i Odlewnictwa,* v. 2, no. 2, 1950, p. 111-122.

Improved calculation procedure. Includes extensive tables and graphs. Average error was reduced 43.6% in comparison with a previous formula described by Siebel and Osenberg (Germany, 1934). 12 ref. (F23)

212-F. Aluminum Die Forging Design Details That Promote Metal Flow. A. E. Favre and A. J. Orazem. *Product Engineering,* v. 21, Sept. 1950, p. 130-134.

Factors that influence dimensions of corner radii at section edges and of fillets at intersections and junctions of ribs and webs. Design of punch-out holes in thin webs and ribs; also design proportions for forged pockets and recesses. (F22, Al)

213-F. Standards and Formulae for Forming Aluminum. E. V. Sharpnack. *Reynolds Metals Technical Advisor,* no. 14, [1950], p. 1-2.

Some recommended standards, formulas, and working suggestions which users have found helpful. Includes table and typical worked example. (F general, G general, Al)

214-F. An Examination of Modern Theories of Rolling in the Light of Rolling Mill Practice. (Continued.) N. H. Polakowski. *Sheet Metal Industries,* v. 27, Aug. 1950, p. 677-690.

Contradictions between theory and practice. Analyzes the compression test in relation to rolling. 32 ref. (To be continued.) (F23)

215-F. (Book) **Drop Forging.** Henry Hayes. Ed. 2. Sir Isaac Pitman and Sons, Ltd., Parker St., Kingsway, London, W.C 2, England. 5s. net.

Not changed greatly since the first edition in 1923, but the illustrations have been revised and replaced fairly extensively. A chapter has been added on "Mechanical Forging Presses", and there is evidence of revision elsewhere. (From review in *Engineering.*) (F22)

G

SECONDARY MECHANICAL WORKING

277-G. Small Short-Run Parts Made by Rubber-Die Process. William J. Bachman. *American Machinist,* v. 94, Aug. 21, 1950, p. 102-103.

Process by which small blanks and formed articles in thin, hard materials ⅛ in. or less in major dimension are produced. (G8)

278-G. Die Sinking for Drop Forging. Part IX. "Locked Dies". John Mueller. *Steel Processing,* v. 36, Aug. 1950, p. 398-401.

When the parting line in a die must change from one level to the other, because of irregular shape of the forging, a "lock" is created. This requires that the die-block faces that carry the forging impression must be machined at different heights. Equipment and procedures. (G16, F22)

279-G. Hydraulic Pressure Forms Gas Tanks. *Iron Age,* v. 166, Aug. 24, 1950, p. 76-77.

Douglas Aircraft developed a method for producing aluminum tanks in which partially formed tanks, after welding and heat treating, are formed by hydraulic pressure. Tank is placed inside the sizing die and hydraulic fluid is pumped into the retaining rubber bag forcing the metal against the die to the final contour. Time required is 3 min., pressure 400 psi. (G1, A1)

280-G. Oxy-Gasoline Cutting of Steel Under Water. (In Russian.) M. G. Makeev. *Avtogennoe Delo* (Welding), v. 21, May 1950, p. 14-16.

New designs of cutting torch for work under water. Optimum conditions of cutting and operating parameters. (G22, ST)

281-G. Cutting Steel With Low-Pressure Oxygen. (In Russian.) S. V. Begun. *Avtogennoe Delo* (Welding), v. 21, May 1950, p. 16-19.

Investigation revealed several basic advantages. A specially designed torch. (G22, ST)

282-G. Allegheny Ludlum Analyzes Drawing Characteristics of Stainless Steels. R. H. Henke. *Steel,* v. 127, Sept. 4, 1950, p. 88-90, 96, 98.

See abstract of "The Drawing of Stainless Steels," *Tool & Die Journal,* item 206-G, 1950. (G4, Q24, SS)

283-G. Can You Friction Saw Nickel-Base Alloys? H. J. Chamberland. *Steel,* v. 127, Sept. 4, 1950, p. 91-92.

Severe laboratory sawing tests reveal that Monels, Inconels, Hastelloys, and Illiums can be successfully cut by high-speed, band-friction methods. Economic factors. (G17, Ni)

284-G. What Causes Distortion in Machining Aluminum? K. R. Van Horn. *American Machinist,* v. 94, Sept. 4, 1950, p. 119-120.

Causes and remedies. (G17, Al)

285-G. 'Rheems' of Steel Shipping Containers. *Industry & Welding,* v. 23, Sept. 1950, p. 48.

Forming and welding of steel drums by Rheem Mfg. Co. (G11, K3, T26, CN)

286-G. Cutting Die Construction Costs. Cashly A. Henry. *Tool & Die Journal,* v. 16, Sept. 1950, p. 47-49, 64, 69.

Metal-forming and die construction details subject to patent application by the author. Dies are fabricated of steel strips and sheet, and mounted in press with rubber pads. Comparative cost analysis. (G8, T5)

287-G. Shafts Machined 500 Pct Faster With Carbides. Frank Haeger. *Iron Age,* v. 166, Sept. 7, 1950, p. 115-116.

Redesigned lathes and adoption of carbide tools have effected a big increase in Oldsmobile axle-shaft production. (G17, T6, C-n)

288-G. Machining of Heated Metals. E. T. Armstrong, A. S. Cosler, Jr., and E. F. Katz. *American Society of Mechanical Engineers,* Paper No. 50-S-5, 1950, 8 pages.

Effect of temperature on machinability, development of heating methods, and hot-machining with arc heating. Results for stainless, alloy, and toolsteels and for vitallium. (G17, AY, SS, TS, Co)

289-G. Modified Brake Used in Stretch Forming. Gilbert C. Close. *Finish,* v. 7, Sept. 1950, p. 17-19; *Light Metal Age,* v. 8, 1950, p. 6-7.

Stretch-forming equipment and procedure developed by Northrop Aircraft. The forming tool is an ordinary hydraulic metal brake with simple modifications that permit it to operate as a precision stretch press. Time required is reduced from 8 hr. to 2 min. for a typical wing section. (G9)

290-G. Production of Caterpillar Steering Clutch Cases. Arthur W. Johnson. *Machinery* (London), v. 77, Aug. 17, 1950, p. 195-201.

Press operations, welding, and machining at Caterpillar Tractor Co. (G1, G17, K general, T21, CN)

291-G. Equipment for Oxygen-Flux Cutting of Chromium and Chromium-Nickel Steels. (In Russian.) S. G. Guzov and O. Sh. Spektor. *Avtogennoe Delo* (Welding), v. 21, June 1950, p. 11-15.

Equipment in which particles of flux, preheated by an oxy-acetylene flame, burn in the jet of oxygen and release a large amount of heat, so that the superheated particles of oxides formed pass into the slag and liquefy, thus establishing conditions necessary for continuous cutting. Sheets of up to 150-mm. thickness may be cut. The basic component of the flux is iron powder. Optimum operating conditions for various thicknesses and types of steels. (G22, SS)

292-G. Deformation of Sheets During Oxy-Acetylene Cutting. (In Russian.) S. L. Petrov. *Avtogennoe Delo* (Welding), v. 21, June 1950, p. 15-20.

Mechanism of edge deformation and methods of preventing or of minimizing it. (G22, ST)

293-G. Cutters With Mechanically Attached Hard-Alloy Tips. (In Russian.) G. D. Shteinbok. *Torfyanaya Promyshlennost* (Peat Industry) v. 27, June 1950, p. 23-24.

Experimental and plant-scale investigations established suitability and advantages, especially for boring and turning lathes. (G17, T6, SG-j)

294-G. Homemade Unit Bends Magnesium Tubing. Herbert Chase. *Iron Age,* v. 166, Sept. 14, 1950, p. 101-102.

Tubing and channels for fabrication of light-weight industrial hand trucks are bent to shape on a homemade air-actuated bending machine. (G6, Mg)

295-G. The Cold Working of the Stainless Steels. Part I. Lester F. Spencer. *Steel Processing,* v. 36, Aug. 1950, p. 383-391, 397.

Characterisitcs of the various compositions, especially with respect to their amenability to the various cold working processes. Chemical composition ranges for the austenitic, martensitic, and ferritic types are tabulated. Tensile and yield strengths, elongations, bend-test data, and hardness of selected compositions in various tempers are tabulated. Various press, shear, punch, and other operations; recommended blanking methods. (To be continued.) (G general, Q general, SS)

296-G. Cartridge Cases From Round Stock. Arthur F. MacConochie. *Steel,* v. 127, Sept. 11, 1950, p. 88-91; Sept. 18, 1950, p. 108-110.

French process for forming small-arms cartridge cases from extruded brass rod. Material loss is said to be only 0.6% as compared to 34% discard in blanking from strip. The process has had extensive commercial application prior to World War II. Part II: metallographic studies of parts produced by progressive steps of the Manurhin process reveal excellent structural properties imparted to the brass by cold working. (G5, T2, Cu)

297-G. Evaluating Tool Performance. Thomas Badger. *Tool Engineer,* v. 25, Sept. 1950, p. 17-20.

Method developed by Westinghouse which accurately predicts shop results for cutting-tool materials. It is a simple lathe test, but experience has shown that it will accurately predict whether a tool material will perform satisfactorily or not. (G17, TS, C-n)

298-G. A Metallurgical Approach to Grinding Hardened Steel. L. P. Tarasov. *Tool Engineer,* v. 25, Sept. 1950, p. 24-27.

Fundamental causes of crack formation during grinding. Grindability, surface cracks, grinding sensitivity, crack detection, grinding burns, detection of burns, and trouble shooting. (G18, S13, ST)

299-G. Selecting Machining and Drawing Fluids. E. L. H. Bastian. *Tool Engineer,* v. 25, Aug. 1950, p. 23-25; Sept. 1950, p. 37-39.

Part I: Purpose of cutting and grinding fluids; soluble oils and emulsions; and application of cutting and grinding fluids. Part II: Classification of compounds; application to press drawing, bar and tube drawing, and rod and wire drawing. (G21, F1)

300-G. How To Cut Costs With Cutting Fluids. E. J. Tangerman. *American Machinist,* v. 94, Sept. 18, 1950, p. 109-116.

Special report. (G21)

301-G. The Merry Go Round for Metal. Richard Cheney. *Steelways,* v. 6, Sept. 1950, p. 18-20.

World's largest spinning and flanging equipment, used for making steel tank heads weighing as much as 17½ tons. Also equipment for producing small-sized spun pieces. (G13, ST)

302-G. Cutting Cast Iron. R. L. Vining. *Welding Journal,* v. 29, Sept. 1950, p. 765-766.

Special cutting technique used to cut cast iron with a standard oxy-acetylene blowpipe. (G22, CI)

H

POWDER METALLURGY

65-H. Iron Powder Developed. *Steel,* v. 127, Sept. 4, 1950, p. 58.

New type being produced by Powdered Iron Corp., Detroit, on a pilot-plant scale. The powder resembles Swedish sponge iron physically, but has the purity of the best electrolytic iron powder. Process and advantages. (H10, Fe)

66-H. Designing Dies for Powdered-Metal Parts. E. Mosthaf. *Machinery* (London), v. 77, Aug. 24, 1950, p. 227-233.

Recommendations clarified by diagrams. Selection of punch and die materials. (H14, T5)

67-H. The Mechanism of Sintering. J. P. Roberts. *Metallurgia,* v. 42, Aug. 1950, p. 123-130.

Present knowledge is reviewed. Evaporation-condensation, surface diffusion, volume diffusion, viscous flow, and plastic flow. 36 ref. (H15, B16)

J

HEAT TREATMENT

190-J. Automatic Heat Treatment of Crankshafts at Oldsmobile Division. *Industrial Heating,* v. 17, Aug. 1950, p. 1324-1326, 1328, 1330, 1332.

Equipment and procedures. (J26, T21, ST)

191-J. Localized Heating. Paul A. Furkert. *Industrial Heating,* v. 17, Aug. 1950, p. 1334, 1336, 1338, 1340, 1342.

Ways in which gas burners of special design can be used to heat limited zones of metallic articles for various fabrication purposes, including localized heat treatment, brazing, silver soldering, stress relief, etc. (J2, K7, K8)

192-J. Airetool Tube Expanders and Cleaners Carefully Heat Treated. *Industrial Heating,* v. 17, Aug. 1950, p. 1350, 1352, 1354, 1356.

Equipment and procedures for heat treating alloy steel tube expanders, cleaners, and refinery specialties. (J general, T29, AY)

193-J. Fast, Flexible, Versatile Commercial Service Offered by Cook Heat Treating Corporation. *Industrial Heating,* v. 17, Aug. 1950, p. 1360-1362, 1364, 1366, 1459-1460, 1462, 1464, 1466, 1468, 1470, 1472.

Equipment and procedures of Los Angeles firm. (J general)

194-J. Carbon Restoration Overcomes 'Soft Skin' on Parts. E. C. Bishop. *American Machinist,* v. 94, Aug. 21, 1950, p. 111-118.

How steel can be restored to original carbon content by batch or continuous heat treatment. Often carbon restoration can be combined with hardening or annealing. Charts facilitate proper control of the furnace atmosphere and temperature for carbon and alloy steels. (J2, CN, AY)

195-J. Nitriding the Martensitic Stainless Steels. Part II. (Concluded.) Howard E. Bover. *Steel Processing,* v. 36, Aug. 1950, p. 403-407, 421.

Study of microstructures from specimens of each type tends to substantiate results shown by the depth-hardness charts, as well as statements made in Part I. 48-hr. salt-spray test specimens show effects of different heat treatments. (J28, SS)

196-J. Induction Hardening Arbor Used on Automatic Screw Machine. Walter G. Patton. *Iron Age,* v. 166, Aug. 24, 1950, p. 65-67.

Two automatics at General Motors' Saginaw Steering Gear Div. that turn bar stock into completely machined bearings and harden them, too. Hardening is done by induction coil and quench arbors mounted on the tool slides. Material specifications call for SAE 1144. (J2, G17, CN)

197-J. Gas Carburization. S. C. Churchill. *Machinery* (London), v. 77, Aug. 10, 1950, p. 172-175.

Difficulties encountered. Mechanism of the solution of carbon in iron. Case hardening of various steels. (J28, ST)

198-J. Induction Surface Hardening Expedites Production, Saves Manpower. *Steel,* v. 127, Aug. 28, 1950, p. 77-78.

Induction hardening carbon-steel parts. (J2, CN)

199-J. Continuous Carburizing Adapted to Job Shop Lots. Herbert Chase. *Iron Age,* v. 166, Aug. 31, 1950, p. 61-63.

How parts are simultaneously carburized to three different case depths in a radiant-tube pusher furnace. (J28, ST)

200-J. Carbo-Nitriding for the Mass Production of Gears. Frank M. Scotten. *Production Engineering & Management,* v. 26, Sept. 1950, p. 53-56.

Practical advantages from this type of case hardening of alloy-steel gears and parts for automatic transmissions at Detroit Gear Div., Borg-Warner Corp. (J28, T21, AY)

201-J. Induction Heating Provides Economy in Production. L. F. Graves. *Production Engineering & Management,* v. 26, Sept. 1950, p. 68-70.

The part is a "snapping roll end ring" used on one and two-row corn harvesters produced by Allis-Chalmers. Cost analysis shows cost reduction of over 40% in comparison with previous procedure—carburization and hardening. (J2, T3, CN)

202-J. Twin Batch-Type Carbonitriding Furnaces Precision-Harden Transmission Pinions. A. H. Allen. *Steel,* v. 127, Sept. 4, 1950, p. 84-85, 104.

Installation at Chevrolet-Cleveland transmission plant. Pinions are SAE-5145 steel. (J28, T21, AY)

203-J. Nitriding—Effect on Fatigue Strength of Stainless Steel. V. T. Malcolm and S. Low. *Journal of Metals,* v. 188, Sept. 1950, p. 1094-1095.

Malcomizing process developed by Chapman Valve Mfg. Co. is a nitriding process primarily developed to permit surface hardening of both the austenitic and ferritic stainless steels. Comparative mechanical test data. (J28, Q7, SS)

204-J. Heat Treatment Plant in the Needle Industry. *Wire Industry,* v. 17, Aug. 1950, p. 659-660.

British equipment. (J general, T10, ST)

205-J. The Relief by Heat Treatment of Externally Applied Stresses to Cast Iron. G. N. J. Gilbert. *British Cast Iron Research Association Journal of Research and Development,* v. 3, Aug. 1950, p. 499-514.

Effect of temperature and time at temperature on the progress of stress relief. A test piece was stressed under conditions of measured stress and then the system was raised to an elevated temperature and, maintaining the strain constant, stress was progressively reduced. Under these conditions, there is a measured imposed stress being relaxed in a manner which may be similar to the relief of casting stresses by heat treatment. (J1, CI)

206-J. Waste-Heat Recovery From a Heat Treatment Furnace; Production of Electrical Energy and Simultaneous Supply of Heat to a Central Heating System. (In French.) *Fonderie,* June 1950, p. 2075-2080.

Installation in a French metallurgical plant. (J general)

207-J. Determination of the Annealing Cycle of Blackheart Malleable Cast Iron. (In French.) Gabriel Joly. *Fonderie,* June 1950, p. 2097-2099.

Technique and factors involved, such as content of Si, Cr, and Mn; overheating prior to casting, furnace atmosphere, rate of cooling after casting, purity of the initial material, etc., and their influence on the annealing cycle. (J23, CI)

208-J. Germans Study Temper Embrittlement. W. M. Baldwin, Jr. *Iron Age,* v. 166, Sept. 14, 1950, p. 92-97. Translated and condensed from "Embrittlement of Hardened Steel by Annealing at 250 to 400° C.", Hans Schrader, Hans-Joachin Wiester, and Heinrich Siepmann.

Previously abstracted from *Archiv für das Eisenhüttenwesen.* See item 104-J, 1950. (J23, Q23, CN, AY)

K

JOINING

495-K. The Silver-Brazed Pipe Line. John B. Ross. *Welding Journal,* v. 29, Aug. 1950, p. 636-639.

The process and miscellaneous applications. Both Cu and steel pipes are joined in this way. (K8, Cu, ST)

496-K. Construction and Maintenance of Pipe Lines. R. D. Smith. *Welding Journal,* v. 29, Aug. 1950, p. 639-642.

Historical development of gas for industrial and home use and the important part played by welding. Modern methods, particularly for oxy-acetylene welding. (K2, T4, CN)

497-K. Gas Welding With Bronze in Production. Clinton E. Swift. *Welding Journal,* v. 29, Aug. 1950, p. 646-650.

Production economics and other advantages are said to merit careful consideration of the process for joining steel furniture and other light-gage metal parts. (K2, ST)

498-K. The Resistance Welding of Mild Steel Sheet. W. S. Simmie. *Welding Journal,* v. 29, Aug. 1950, p. 651-654.

Compares British and American methods for the automotive industry. (K3, T21, CN)

499-K. Automatic Inert-Gas-Shielded Arc-Welding Operations. H. O. Jones. *Welding Journal,* v. 29, Aug. 1950, p. 655-656.

Some recent developments and applications to production problems. (K1)

500-K. Hydrogen May Be Useful. R. F. Wyer. *Welding Journal,* v. 29, Aug. 1950, p. 659-660.

Uses in atomic-hydrogen arc welding and as a protective atmosphere for preventing oxidation of arc welds during cooling. (K1)

501-K. Tips for Easy Inert-Gas-Shielded Arc Welding. A. U. Welch. *Welding Journal,* v. 29, 1950, p. 664.

Recommendations applicable to aluminum. (K1, A1)

502-K. Alloying Elements in Chromium-Nickel Stainless Steels. Helmut Thielsch. *Welding Journal,* v. 29, Aug. 1950, p. 361s-404s.

Data on stainless steels during the past decade are reviewed and correlated. Effects of the various residual and alloying elements on physical and welding metallurgy of the major grades of stainless. Effects of the various elements on structure and on corrosion resistance, and of thermal treatments. Welding electrode and electrode-coating compositions. 233 ref. (K general, SS)

503-K. Fatigue Strength of Welded Butt Joints. *Welding Journal,* v. 29, Aug. 1950, p. 404s-408s.

Appendix III to Report No. 3 of the Committee on Fatigue Testing (Structural). Investigation of fatigue strength of double-U, groove-welded butt joints with partial joint penetration in ⅞-in. steel plate and of fatigue tests of single-V, groove-welded butt joints, welded from both sides, in ½-in. steel plate. (K9, Q7, CN)

504-K. Indexing Fixtures Applied to Spotwelding. O. Stenson and W. R. Spick. *American Machinist,* v. 94, Aug. 21, 1950, p. 110.

Like a dial-feed device for a

punch-press operation, eight fixtures rotate under an automatic spotwelder to turn out small, simple assemblies for telephone relays. (K3)

505-K. A Comparison of Progress in Resistance Welding in Britain and America. W. S. Simmie. *Sheet Metal Industries,* v. 27, Aug. 1950, p. 723-726.
Review applies particularly to the automotive industry. (K3, T21, CN)

506-K. Heavy Plate Fabrication. *Welding,* v. 18, Aug. 1950, p. 326-334.
The fabrication shops of the John Inglis Co., Toronto. Welding methods used for producing various gear casings, pressure vessels and glass-lined tanks. Illustrated.
(K general, T26, CN)

507-K. M. V. "Rupertsland"—The Construction of an All-Welded Cargo Vessel. *Welding,* v. 18, Aug. 1950, p. 335-342.
Prefabrication of large units was adopted throughout. Methods of welding the various assemblies.
(K general, T22, CN)

508-K. Fountain Pen Production. *Welding,* v. 18, Aug. 1950, p. 343-344.
Projection weld fabrication of stainless steel parts. (K3, SS)

509-K. What Is the Future of Gas Welding? T. J. Palmer. *Welding,* v. 18, Aug. 1950, p. 349-355.
Recent developments in gas welding equipment and technique. Applications and relation to other methods of welding. It is felt that, in its own field, gas welding still has an assured future. Deals with cast iron and mild steel parts.
(K2, CI, CN)

510-K. Rectifier Equipment for D.C. Arc Welding. *Engineer,* v. 190, Aug. 4, 1950, p. 129.
Equipment is claimed to combine the simplicity of a.c. welding plant with the advantages of the d.c. arc for certain classes of work. (K1)

511-K. Automatic Arc Welding Under a Double Layer of Flux. (In Russian.) K. K. Khrenov and D. M. Kushnerev. *Avtogennoe Delo* (Welding), v. 21, May 1950, p. 3-6.
This method would permit industrial utilization of simple, inexpensive, not previously fused fluxes and would reduce the amount of preparation and cleaning of the base metal required. An active flux layer is placed over the base metal which enters chemically into the welding process, followed by a passive layer which may consist of granular material and which acts solely to maintain static pressure on the bath of liquid metal. Results obtained using different flux compositions on low-carbon steel. (K1, CN)

512-K. Applicability of Bend Testing of Welded Joints. (In Russian.) A. M. Makara and B. S. Kasatkin. *Avtogennoe Delo* (Welding), v. 21, May 1950, p. 6-13.
Two versions of the same low-carbon steel were tested, one dead melt and the other "bubbling". Influence of relation between strengths of base and of weld metals, of aging time, of heat treatment, and presence of microdefects on quality of the welds was investigated. Comparative data for five types of joints. 11 ref. (K9, CN)

513-K. Experiment on Use of High-Grade Electrodes in the Machine-Construction Industry. (In Russian.) S. K. Zvegintsev and E. A. Sirota. *Avtogennoe Delo* (Welding), v. 21, May 1950, p. 19-21.
Different electrodes for welding of low-alloy steel were investigated. Technological characteristics of different base metal and coating compositions. (K1, T7, AY)

514-K. Weldability of "Bubbling" Steel. (In Russian.) P. N. Berezkin. *Avtogennoe Delo* (Welding), v. 21, May 1950, p. 21-22.
Experimental investigation shows that thin sheets of "bubbling" steel should not be used for welded joints requiring hermetic sealing and operating under dynamic impact loads. (K9, ST)

515-K. Fast Welding Speeds Refrigerator Output. *Steel,* v. 127, Aug. 28, 1950, p. 76.
Several novel welding techniques used at the Frigidaire Div. Electric seam and spot welding are emphasized. (K3, T10)

516-K. Nickel-Molybdenum-Vanadium Alloy Steel Shielded-Arc Welding Electrodes (Low-Hydrogen Type). E. H. Franks, C. T. Gayley, and W. H. Wooding. *Journal of the American Society of Naval Engineers,* v. 62, Aug. 1950, p. 601-619.
Composition and development of these electrodes for welding of armor plate. Operating characteristics, including effects of moisture. Problems encountered during use in the field. Macrographs show weld cracks and weld structures. Procedures found to give satisfactory results.
(K1, T5, CN, AY)

517-K. Quick Test Eliminates Brazing Defects. *Iron Age,* v. 166, Aug. 31, 1950, p.59.
Simple visual test on cupro-nickel specimens which quickly and accurately determines brazability. It is based on the high correlation between surface brightness and brazability. (K8, Cu)

518-K. Gas—Steel—and Glass. Arthur Q. Smith. *Industrial Gas,* v. 29, Aug. 1950, p. 10-12.
Weld fabrication of glass-lined tanks by A. O. Smith Corp.
(K11, T26, CN)

519-K. Producting "Man-Sized" Storage Tanks With Glass-on-Steel Interiors. *Finish,* v. 7, Sept. 1950, p. 29-32.
Equipment and procedures of A. O. Smith Corp. Includes plate forming, welding, blast cleaning, application of vitreous material by spraying, and firing. (K11, T26, CN)

520-K. New Method of Brazing and Soldering. *Automotive Industries,* v. 103, Sept. 1, 1950, p. 51, 58.
Gun method, developed primarily for use in connection with a suitable conveyer system, is said to result in a great increase in speed, a large saving in materials used, and a cleaner and neater job. (K7, K8)

521-K. Design of Arc Welding Fixtures. H. G. Frommer. *American Machinist,* v. 94, Sept. 4, 1950, p. 161, 163.
Brief recommendations are supplemented by illustrations of typical set-ups. (K1)

522-K. Process Speeds Welding. *Steel,* v. 127, Sept. 4, 1950, p. 98.
New Lincoln Electric high-density, hidden-arc method which requires little or no joint preparation. (K1)

523-K. Keeping Them in the Air. W. P. Hoare. *Welding Engineer,* v. 35, Sept. 1950, p. 17-19.
Maintenance welding shop of United Air Lines, South San Francisco.
(K general, T24)

524-K. Resistance Welding To Replace Soldering. Russell F. Smith. *Welding Engineer,* v. 35, Sept. 1950, p. 20-22.
Various examples at Delco-Remy Div., General Motors Corp. Enumerates 10 advantages. (K3)

525-K. "Triple Ending" Pipe Line. Margaret Ralston. *Welding Engineer,* v. 35, Sept. 1950, p. 24-25.
Equipment and procedures for joining three 30-ft. lengths of 34-in. gas pipe line. (K1, T4, CN)

526-K. Build a Swimming Bridge for Princeton. Albert Bavaria. *Welding Engineer,* v. 35, Sept. 1950, p. 26-27.
Construction of welded wrought-iron structure used to start swimming races at Princeton University.
(K1, T26, CN)

527-K. To Join These Two Castings Took 10,000 Lb. of Thermit. J. M. Wilson. *Welding Engineer.* v. 35, Sept. 1950, p. 31.
50-ton housing of an ingot stripper stand was cast in two halves joined by thermit welding. It took 2800 lb. of thermit to join the crowns, 7200 lb. to make the two footing welds. (K4, CI)

528-K. Are You Up-to-Date on Resistance Welding? W. K. Boice. *Welding Engineer,* v. 35, Sept. 1950, p. 38-41, 56.
Significant advances such as frequency changers, metallic rectifiers, and slope controls. Circuit diagrams. (K3).

529-K. Induction Brazing Reduces Cost. R. E. VanDeventer and G. S. Bidigare. *Machine Design,* v. 22, Sept. 1950, p. 140, 202.
Use of induction brazing in the planetary cage and output shaft assembly for the Packard Ultramatic transmission. As originally designed, these parts would have been made from two forgings. A slight design change permitted taking advantage of induction silver brazing, making it possible to use two pearlitic malleable castings and a steel shaft.
(K8, T21, CI)

530-K. Electronic Welder Speeds Strip Pickling. *Iron Age,* v. 166, Sept. 7, 1950, p. 106.
Flash welder and controls for joining coils of sheet stock in high-speed strip-pickling lines at Westinghouse's East Pittsburgh plant. (K3, L12, CN)

531-K. Castings and Plate Combined for Fabrication Economy. Omer Blodgett. *Iron Age,* v. 166, Sept. 7, 1950, p. 110-111.
How Falk Corp. obtains maximum economy in large weldments by proper use of both steel castings and steel plate welded together in fabrication of heavy machinery.
(K1, ST, CI)

532-K. How To Weld Magnesium by the Gas-Welding Processes. Part Two. Paul Klain. *Industry & Welding,* v. 23, Sept. 1950, p. 26-28.
Recommended procedures.
(K2, Mg)

533-K. Use of the Inert Gas Shielded Arc Process for Welding Aluminum. Paul Paquin. *Industry & Welding,* v. 23, Sept. 1950, p. 40, 42-43, 82.
(K1, Al)

534-K. Clear the Track for Welding. *Industry & Welding,* v. 23, Sept. 1950, p. 44-45, 64.
Use of welding in fabrication of miniature trains for amusement parks. Stainless and carbon steels are used. (K general, CN, SS)

535-K. Unique Method of Construction Speeds Field Erection of 250 Ton Assembly. *Industry & Welding,* v. 23, Sept. 1950, p. 62-63.
Assembly and welding of 150-ft. catalytic cracking tower.
(K general, T29, CN)

536-K. Induction Heating Doubles Cylinder Soldering Production. John Nelson. *Steel,* v. 127, Sept. 11, 1950, p. 95-98.
Use of induction heat to silver braze a variety of steel hydraulic cylinders. (K8, ST)

537-K. Copper Furnace Brazing Saves Time—Labor—Material in Formation of Assemblies. Mario R. Glick. *Western Metals,* v. 8, Aug. 1950, p. 22-23.
Application to various carbon and alloy steel parts at Fabriform Metal Products, Inc., Los Angeles.
(K8, AY, CN)

538-K. Design for Welded Continuous Steel Framing. J. B. McCormick.

Progressive Architecture, v. 31, Sept. 1950, p. 94-96.

Unique design developed by a Los Angeles engineer.
(K general, T26, CN)

539-K. Cold Welding. *Fortune*, v. 42, Sept. 1950, p. 114-116, 120, 122, 124.

English invention which has been applied to a variety of nonferrous metals. Various finished products made by cold welding. Present status of commercial development of the process in Britain by General Electric, Ltd., and in the U. S. by Koldweld Corp. (K5, EG-a)

540-K. Applications of Unionmelt Welding. C. A. Heffernon. *Canadian Metals*, v. 13, Aug. 1950, p. 32-34, 48.

Procedures and applications. (K1)

541-K. Developments in the Cold Riveting of Aluminium. Ernest Anders and D. G. Elliot. *Engineering*, v. 170, Aug. 11, 1950, p. 141-143. Condensed from *Engineering Journal*, v. 33, June 1950.

Technique developed for use on the aluminum bridge recently built in Canada. Experimental program conducted to determine optimum rivet design, dimensions, and riveting procedure. (K13, T26, Al)

542-K. Steel Fabrication; Saving Material on Press Dies and on Girders. *Iron and Steel*, v. 23, Aug. 1950, p. 356.

"Composite forging" method for making large dies. Toolsteel is flash-butt welded to a mild-steel base. Another steel-saving method consists of a patented castellated-beam construction involving flame cutting and welding.
(K3, G22, T5, T26, ST, TS)

543-K. Repair and Reclamation of Grey-Iron Castings by Welding and Allied Methods. A. B. Everest, chairman. *Foundry Trade Journal*, v. 89, Aug. 24, 1950, p. 207-214, 216.

Report of Subcommittee of Technical Council, Institute of British Foundrymen gives detailed, classified recommendations.
(K general, L24, CI)

544-K. Structural Welding in the Ottmarsheim Shipyard. (In French.) J. Négre. *Soudure et Techniques Connexes*, v. 4, May-June 1950, p. 107-114; discussion, p. 114-115.

Equipment and procedures of French shipyard. Various types of welding are used.
(K general, T22, CN)

545-K. Arc Welding of Light Metals Using Coated Fusible Electrodes. (In French.) Charles Guinard. *Revue de l'Aluminium*, v. 27, June 1950, p. 237-244.

Equipment and procedure. Illustrates weld structures; tabulates weld strengths. (K1, Al)

546-K. Calculation of Weld Strengths on the Basis of True-Stress Diagrams. (In Russian.) *Avtogennoe Delo* (Welding), v. 21, June 1950, p. 4-11.

On the basis of theoretical considerations, a method is developed for calculation of maximum load. Results for a number of simple welds are compared with experimental data, and applicability of the calculation method proved.
(K9, Q23)

547-K. Technological Parameters of Automatic Welding Using "Electrorivets". (In Russian.) I. E. Futer. *Avtogennoe Delo* (Welding), v. 21, June 1950. p. 28-29.

Welding with preliminary formation of a hole in the upper one of the pieces to be joined without insertion of the electrode into the hole after excitation of the arc was investigated. Limits of applicability of this method and means of expanding its range. (K1)

548-K. Welding, Brazing and Soldering of Plated Metals. E. V. Beatson. *Metal Finishing*, v. 47, June 1949, p. 93-96.

Previously abstracted from *Journal of the Electrodepositors Technical Society*. See item 22A-50, 1949.
(K general)

549-K. All Welded Steel Cab Fabricated With Modern Equipment and Latest Methods. Wilson B. Fiske. *Machine and Tool Blue Book*, v. 46, Oct. 1950, p. 71-74, 76-78.

Special jigs and fixtures, combined with closely adapted and controlled stationary and portable spot welders, result in production efficiency along line of White Motor Co., Cleveland. (K3, T21, CN)

550-K. Electric Welding. *General Electric Review*, v. 53, Sept. 1950, p. 81-83.

Technical and economic significance of developments and trends. R. C. Freeman discusses "Electric-Arc Welding", and W. B. Hills, "Electronic Control of Resistance Welding. (K1, K3)

551-K. Modified Submerged-Arc Process Lowers Welding Costs. *Steel*, v. 127, Sept. 18, 1950, p. 106.

Special equipment designed to minimize oxidation in seam welding major components for heat exchangers. Flux is supplied from a hopper on the cantilever beam for each welder. The hopper includes an outlet tube which disperses flux in the V-shaped groove for each portion of a seam for a distance of several inches ahead of the welding arc. Wire filler materials are fed automatically. (K1, ST)

552-K. 6 Steps to Better Silver Brazing. Roger Metzler. *American Machinist*, v. 94, Sept. 18, 1950, p. 100-102.

Six rules for high-quality results. Mechanical-strength data for the joints are charted vs. thickness. Standard compositions and their melting and flow-points.
(K8, Cu, Ni, Fe, Ag, Zn)

553-K. Resistance Welding Applications. R. T. Gillette. *American Machinist*, v. 94, Sept. 18, 1950, p. 135, 137, 139.

Schematic diagrams show details of a variety of simple pieces and components for which resistance welding is suitable. (K3)

554-K. Soft Soldering of Electroplated Aluminium Alloy Components. E. E. Halls. *Electroplating and Metal Finishing*, v. 3, Sept. 1950, p. 493-494.

Compositions of soldering pastes for Al alloys, plated with Cu, Sn, and Ag. Considers use of induction heating. (K7, Al)

555-K. Types of Joints for Welded Piping. *Heating, Piping & Air Conditioning*, v. 22, Sept. 1950, p. 102-105.

The various types of joints used in welded industrial piping systems.
(K general)

556-K. Double-Jointing Pipe in the Field. Frank H. Love. *Petroleum Engineer*, v. 22, Sept. 1950, p. D20, D22, D24.

Equipment and procedures for submerged-arc welding of 30-in. pipeline. Special lineup clamp that makes possible welding without use of a stringer bead. (K1, CN)

557-K. Some Basic Problems in Design for Aircraft Welding. J. Koziarski and K. B. Gillmore. *Welding Journal*, v. 29, Sept. 1950, p. 709-714.

Metallurgical, corrosion, production, and stress problems, and a few specific applications.
(K general, T24)

558-K. Suggested New Welding Standards. James F. Lincoln. *Welding Journal*, v. 29, Sept. 1950, p. 715-717.

Plea for simplification of welding standards and elimination of unessential testing. (K9, S22)

559-K. Flash Welding Nonferrous Materials. F. L. Brandt. *Welding Journal*, v. 29, Sept. 1950, p. 718-722.

Compares equipment and procedures with those for ferrous materials. Newly developed techniques and welding conditions and results.
(K3, EG-a)

560-K. "Heliarc" Welding in Production. T. E. Piper. *Welding Journal*, v. 29, Sept. 1950, p. 723-728.

Developments of inert-gas shielded-arc welding in production applications in an aircraft plant based on economy of equipment, quality, ease of fabrication, uniformity, and lowered costs. (K1, T24)

561-K. Welded Aluminum Ammonium Nitrate Prilling Tower. H. N. Hockensmith. *Welding Journal*, v. 29, Sept. 1950, p. 729-732.

How equipment was fabricated from Al 61-S-T6 to withstand severe service conditions involving strength, fatigue, corrosion, and temperature changes. (K1, T29, Al)

562-K. Welding at the Railroad Reclamation Plant. W. G. Muschler. *Welding Journal*, v. 29, Sept. 1950, p. 733-738.

Various jobs of repair welding, both gas and arc. (K general, T23)

563-K. Development of Production Welding Technique. J. Raymond Wirt. *Welding Journal*, v. 29, Sept. 1950, p. 740-744.

Special resistance welding machines, automatic inspection and timing devices, personnel considerations, and careful attention to specific applications at Delco-Remy Div., General Motors Corp. (K3)

564-K. Electric Utility Welding in the Shop and Field. David P. O'Connor. *Welding Journal*, v. 29, Sept. 1950, p. 745-751.

A variety of welding processes are utilized in maintenance and overhaul operations of an electric-power system. (K general, T1)

565-K. Crack Sensitivity of Aircraft Steels. A. W. Steinberger, B. J. DeSimone and J. Stoop. *Welding Journal*, v. 29, Sept. 1950, p. 752-764.

Investigation of the relative cold-crack sensitivity of several kinds of weld-filler metal used in aircraft construction. The principal materials studied were modified SAE 4320, 4330, and 6130. Tests were also conducted with SAE 4130, NE 8630 and Types 310, 347, and 410 stainless steel filler materials.
(K9, T5, T24, AY, SS)

566-K. Spiral Tubing Produced by "Heliarc" Welding. *Welding Journal*, v. 29, Sept. 1950, p. 769.

Coiled strip is stretched into a spiral having adjacent sections in contact. Coiled strip of proper width is placed on the forming machine and forced through a die that makes the spiral. As the tube emerges from the die it passes under the Heliarc torch and the seam is automatically welded. The tube can then be given a cold draw to produce a perfectly smooth surface. Applicable to ferrous and nonferrous metals. (K1)

567-K. Helium Vs. Argon for Welding of Aluminum. A. J. Last. *Welding Journal*, v. 29, Sept. 1950, p. 770-771.

Tests indicate that the helium welds are stronger than the argon welds. Argon is still used for manual welding because of greater ease of arc manipulation. (K1, Al)

568-K. Disappearing Welds. M. L. Powers. *Welding Journal*, v. 29, Sept. 1950. p. 772.

Special truck bodies are oxy-acetyline welded and finished with solder so that the welds are completely invisible. (K2, K7, T21, CN)

569-K. Effects of Reduced Atmospheric Pressure on Arc-Welding Characteristics. M. L. Begeman, B. H Amstread, and U. I. Mashruwala. *Weld-*

ing Journal, v. 29, Sept. 1950, p. 433s-440s.

Pressures down to 5 in. Hg absolute were investigated. Mild steel plates were welded in an enclosed chamber with a semi-automatic welding head. Beads were first deposited under conditions which were optimum for the electrode under atmospheric pressure. Then, optimum conditions were determined for the various pressures by running beads at different currents and arc lengths. Significant changes in arc characteristics and weld properties were observed. Equipment and procedure. Macrographs show effects of current and arc-length variation on bead shape. (K1, CN)

570-K. The Projection Welding of 0.010 and 0.020-In. Steel Sheet. E. F. Nippes, J. M. Gerken, and J. G. Maciora. *Welding Journal*, v. 29, Sept. 1950, p. 441s-449s.

Effects of projection size and shape, welding current, electrode force, electrode-tip material and sheet surface resistance were studied. Macrographs show weld sections. Recommended conditions for AISI 1010, 1015, and 1020 steels in 0.040, 0.062, and 0.125 in. thicknesses, as well as for AISI 1010 in 0.010 and 0.020-in. thicknesses. (K3, CN)

571-K. Effect of Low-Temperature Cooling Rate on the Ductility of Arc Welds in Mild Steel. A. E. Flanigan, S. I. Bocarsky, and G. B. McGuire. *Welding Journal*, v. 29, Sept. 1950, p. 459s-466s.

The ductility of E 6010 welds is shown to depend on the cooling rate of the weld below 400° F., rapid cooling promoting low ductility. This behavior, to which low-hydrogen welds appear immune, has important practical implications. (K9, Q23, CN)

572-K. A Survey of Modern Theory on Welding and Weldability. D. Séférian. *Sheet Metal Industries*, v. 27, Aug. 1950, p. 727-730, 732.

Technical and structural weldability tests. Weldability of aluminum and light alloys. (To be continued.) (K9, Al)

573-K. Soldering of Aluminium; Avoidance of Brittlement. *Metallurgia*, v. 42, Aug. 1950, p. 131-133.

Experimental work shows that some Al alloys may be subject to brittleness and cracking as a result of penetration by solder during tinning. Method of soldering involving pretreatment by abrasion or by phosphoric-nitric acid treatment followed by tinning with Sn-Zn solder and finishing with Sn-Pb lead. (K7, Al)

574-K. (Book) **Recommended Practices for Salvaging Automotive Gray Iron Castings by Welding.** *American Welding Society*, 33 W. 39th St., New York 18, N. Y. 19 pages. 50 cents.

A tentative standard. Methods used for automotive repairs can serve as a guide for repairing other types of castings. Oxy-acetylene and shielded-arc welding with and without preheat and stress relief, braze welding, brazing, soft soldering, metallizing, and use of mechanical methods. Typical defects and their repair. (K general, L24, T21, CI)

575-K. (Book) **Recommended Practices for Resistance Welding.** Rev. ed. 60 pages. American Welding Society, 33 W. 39th St., New York 18, N. Y. $1.00.

Welding schedules for spot and seam welding mild and medium carbon steels, low-alloy steels, stainless steels, Ni, monel, Inconel, and Mg alloys. Recommended practices for projection welding of low-carbon and stainless steels. Flash welding data for low and medium strength forging steels. Methods of testing resistance welds. (K3)

576-K. (Book) **Welding, Brazing, and Soldering.** 95 pages. 1949. Popular Mechanics Co., Chicago. $1.25.

Twenty articles reprinted from *Popular Mechanics*. Stainless steel and aluminum are among the materials discussed. Emphasis is placed on methods of using available types of equipment to keep costs down. (K general)

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CLEANING, COATING AND FINISHING

557-L. Chrome Plating Improves Stainless Steel Grilles. Joseph Geschelin. *Automotive Industries*, v. 103, Aug. 15, 1950, p. 48-49, 116, 118.

Equipment and procedures. Includes mechanical polishing, press operations, plating, and welding. (L17, SS, Cr)

558-L. Conveyorized Finishing of Metal Kitchen Cabinets. J. F. Snider and A. R. Nasrallah. *Industrial Finishing*, v. 26, Aug. 1950, p. 48-50, 52, 54, 58.

Metal cleaning; rustproofing; spraying hot synthetic and enamel in pressurized finishing rooms; baking application and enamel. (L general, T10, CN)

559-L. Flock: Its Uses and Its Possibilities. *Industrial Finishing*, v. 26, Aug. 1950, p. 60-62, 64, 66, 71, 73-74, 76, 78, 80.

Flock process and its applications for decorative finishing of miscellaneous metallic and nonmetallic products. (L26)

560-L. New Finish Gives Aluminum Good Wear Resistance. Charles F. Burrows. *Iron Age*, v. 166, Aug. 24, 1950, p. 73-75.

"MHC" film finish developed by Glenn L. Martin Co. gives a scratch and wear resistant coating which is file hard, smooth, and heat resistant. Wear resistance is superior to that of hard chrome plating or cyanide case hardened steel. Effects on yield strength, ultimate strength, and elongation. (L19, Al)

561-L. Performance of Coal-Tar Enamel on Steel Water Pipe and Penstocks. Graydon E. Burnett. *Journal of the American Water Works Association*, v. 42, Aug. 1950, p. 741-748.

Modern coal-tar enamel, properly used, can effectively mitigate the interior corrosion of steel water pipe for a long period. A wrapped coal-tar-enamel coating, supplemented by cathodic protection as needed, is believed to provide virtually permanent protection to the exterior of buried steel pipe. 16 ref. (L26, CN)

562-L. Airless Blast Cleaning Aids Servel. *Steel Processing*, v. 36, Aug. 1950, p. 401, 414.

Use of airless, centrifugal-type, abrasive-blast cleaning of steel surfaces prior to Al coating, in manufacture of refrigerators. (L10, ST)

563-L. Control of Electroplating Solutions by Analysis and Observation. XII. Electro-Analysis of Plating Solutions Using Home-Made Apparatus. K. E. Langford. *Electroplating and Metal Finishing*, v. 3, Aug. 1950, p. 443-445, 454.

Apparatus may be constructed from comparatively inexpensive materials. (L17, S10)

564-L. Nickel Pickling in the Porcelain Enamel Industry. J. M. Zander. *Electroplating and Metal Finishing*, v. 3, Aug. 1950, p. 446-449.

Use, operation, and control of nickel dip bath in preparing steel surfaces for porcelain enameling. (L27, L12, ST)

565-L. Research From Abroad. An Analysis of Recent Russian Work and Patents in the Metal Finishing Field. *Electroplating and Metal Finishing*, v. 3, Aug. 1950, p. 453-454.

(L general)

566-L. Indium Alloy Deposits for Anti-Friction Bearings. *Electroplating and Metal Finishing*, v. 3, Aug. 1950, p. 459-460.

Deposition of In-Cu, In-Zn, and In-Sn alloys. (L17, T7, Cu, In, Sn, Zn)

567-L. Paint Adhesion on Aluminium. *Electroplating and Metal Finishing*, v. 3, Aug. 1950, p. 465.

Chromate-permanganate pretreatment. (L14, Al)

568-L. A Survey of the Chemical Aspects of Some Degreasing Processes Used for Metal Finishing. J. G. Baker. *Sheet Metal Industries*, v. 27, Aug. 1950, p. 737-742.

Trichorethylene and wet degreasing—their advantages and disadvantages. Need for two-step process. (L12)

569-L. Some Notes on the Electroplating of Stainless Steels. E. E. Halls. *Sheet Metal Industries*, v. 27, Aug. 1950, p. 747-748.

Need for electroplating for various applications. Cathodic treatment and electroplating procedures. (L17, SS)

570-L. "Chromizing"—Details of a Process for Forming Chromium-Rich Layers on Steel. Philippe Galmiche. *Sheet Metal Industries*, v. 27, Aug. 1950, p. 749-750. Translated from *La Recherche Aeronautique*, Mar.-Apr. 1950.

A simplified gaseous cementation method forming smooth composite diffusion alloys which may contain —in addition to Cr—Si, Al, or Zr. These surface alloys are highly resistant to oxidation, deformation, and thermal shock. 13 ref. (L15, ST, Cr)

571-L. A Critical Examination of Certain "Martensitic" Hardfacing Electrodes. E. Bishop. *Welding*, v. 18, July 1950, p. 290-298; Aug. 1950, p. 345-348.

First part: Composition, hardness and structure of seven deposits. Second part: Effects of base-metal admixture and preheating. Compositions, hardness data and weld microstructures. (L24, Q29, T5, AY)

572-L. Hot Dip Galvanizing. *Metal Industry*, v. 77, July 28, 1950, p. 51-53; Aug. 4, 1950, p. 69-71; Aug. 11, 1950, p. 85-86.

Summarizes proceedings of international conference at Copenhagen. (L16, Zn, CN)

573-L. On the Principles of Electrodeposition of Metal Powders. (In English.) Gosta Wranglen. *Transactions of the Royal Institute of Technology*, No. 37, 1950, 39 pages.

The formation of powdery and spongy metal deposits on the cathode. Factors responsible for their formation in the fused-salt electrolysis and of Cu, Fe, Ni, Zn, and Cd electrolysis. Other theories of powder formation, involving assumptions of secondary oxidation at the cathode and discharge of complex ions, are criticized. 59 ref. (L17, Cd, Cu, Fe, Ni, Zn)

574-L. Electroplating Thoroughout the World. *Metal Finishing*, v. 48, June 1950, p. 74-107, 110-132.

Survey articles as follows: "Argentina", Robert C. Bray; "Australia", J. J. Dale; "Brazil", Alberto

Paulo Ribbe; "Canada", A. C. West; "China", C. C. Wong; "England", S. Wernick; "Finland", Erik Nordgren; "France", Paul E. Bourgeois and Joseph B. Loiseau; "Germany", Richard Springer; "India", T. Banerjee and Bhupal Naha; "Italy", Roberto Piontelli; "Japan", Sakee Tajima, "Low Countries" (anon.); "Mexico", Miguel Bosch and Tomas Rodriguez, V; "South Africa", Harold Knocker; "Spain", Vicente Massuet Grau, Joaquin Agullo Marly, and Juan Vericat Raga; "Sweden", Helle C. Quarnstrom; and "Switzerland", Henry Reymond. (L17)

575-L. High Production Gold Plating. M. Shapiro. *Metal Finishing,* v. 48, July 1950, p. 46-49.

Recommended procedures on the basis of experience in the plating department, Gillette Safety Razor Co. (L17, Au)

576-L. The Determination of Impurities in Nickel Plating Solutions. Part II. Louis Silverman. *Metal Finishing,* v. 48, July 1950, p. 50-55.

Detailed procedures for Cu, Fe, Pb, Mg, SiO_2, Sn, and Zn. (L17, S11, Ni)

577-L. Hard Chrome Plating on Aluminum Alloys. K. Gebauer. *Metal Finishing,* v. 48, July 1950, p. 56-58, 64. Reprinted from translation in *Metal Industry,* v. 76, Mar. 10, 1950, p. 186-188.

Previously abstracted from *Archiv für Metallkunde.* See item 8-165, 1949. (L17, Cr, Al)

578-L. Electroplating Bright, Hard Nickel-Phosphorus or Cobalt-Phosphorus Alloys. *Metal Finishing,* v. 48, July 1950, p. 65, 67.

See abstract of "Electrodeposition of Alloys of Phosphorus and Nickel or Cobalt", Abner Brenner, Dwight E. Couch, and Eugenia Kellogg Williams, *Plating,* items 64-L and 98-L. (L17, Co, Ni)

579-L. Water-Soluble Cutting Oils as Pickling Inhibitors. Karl F. Hager and Morris Rosenthal. *Oil and Gas Journal,* v. 49, Aug. 24, 1950, p. 142-143, 145.

The above are efficient against acid attack of the base metal, and in addition, give a temporary protection against rerusting. Mild steel (SAE 1010) was used for test specimens. (L12, CN)

580-L. Metal Spraying Pays Off as "Finishing Tool". *Steel,* v. 127, Aug. 28, 1950, p. 79-80, 82.

Conditions governing type of coating needed. Paint vehicles, long-term protection, industrial vs. mild atmospheres, fresh water vs. sea water, and corrosion at elevated temperatures. Sealing and finishing of sprayed metal. Involves Al and Zn coatings. (L23, R3, R4, Al, Zn)

581-L. Galvanizing by the Sendzimir Process. K. Oganowski. *Blast Furnace and Steel Plant,* v. 38, Aug. 1950, p. 912-916.

See abstract of "Armco Takes Wraps Off Sendzimir Galvanizing Process", *Iron Age,* item 391-L, 1950. (L16, Zn, ST)

582-L. Conveyers Speed Sash Finishing. Walter Rudolph. *Iron Age,* v. 166, Aug. 31, 1950, p. 56-59.

Truscon Steel's new million-dollar steel window-sash plant which includes a fully conveyerized Bonderizing-priming installation. Frames and vents, fabricated from cold rolled sheet stock, are cleaned, Bonderized, painted, and baked within 100 min. (L14, L26, T26, CN)

583-L. Methods of Evaluating Aircraft Primers. Edward T. Nelson. *ASTM Bulletin,* July 1950, p. 88-90; discussion, p. 90-92.

Method for evaluating physical, film, and resistance properties of primers for Al alloys, steel, and Mg alloys. (L14, Al, Mg, ST)

584-L. Porcelain Enamel as a Corrosion Resistant Coating for Metals. G. H. McIntyre. *Enamelist,* v. 27, Summer-Fall 1950, p. 3-9. (L27)

585-L. Control of Quality by Application, Drying and Firing of Porcelain Enamel. E. E. Bryant. *Enamelist,* v. 27, Summer-Fall 1950, p. 15-19.

Recommended equipment and procedures. (L27)

586-L. Cost Reduction in Porcelain Enamel Operations Through Product and Process Control. Part I. Product Control. Harold P. Connare. *Enamelist,* v. 27, Summer-Fall 1950, p. 20-27.

Recommended equipment and procedures. (To be continued.) (L27)

587-L. Determination of Opacity by Means of a Translucency Meter. Jesse DeLafayette Walton, Jr. *Enamelist,* v. 27, Summer-Fall 1950, p. 31-36.

Equipment and procedures as applied to porcelain enamel. Typical data. (L27)

588-L. A High Temperature Porcelain Enamel for Tungsten. J. C. Horsfall. *Enamelist,* v. 27, Summer-Fall 1950, p. 39-41.

Development of a porcelain enamel for tungsten which has a PCE of 30. (L27, W)

589-L. Latex Films as Temporary Protective Coatings for Metal Surfaces. *Rubber Age,* v. 67, Aug. 1950, p. 560.

New rubber latex that is applicable to iron and steel as well as nonferrous and enameled surfaces. It is applied by a dipping process. (L26)

590-L. When To Use Electrolytic Polishing. C. E. Naylor. *Plating Notes,* v. 2, June 1950, p. 91-95.

Limitations of electropolishing as a production process, and recommendations concerning its application to the finishing of specific alloys and articles. Status of the process, particularly its use in conjunction with mechanical polishing. (L13)

591-L. Additive Compounds in Electroplating. Marvin Rubinstein. *Metal Finishing,* v. 48, May 1950, p. 54-58, 78; Aug. 1950, p. 51-56, 58.

Prevalent theories of the mechanism of addition-agent action in plating solutions. (L17)

592-L. Preparing Zinc-Base Die Castings for Electroplating. Joseph Haas. *Metal Finishing,* v. 48, Aug. 1950, p. 57-58.

Originally intended as a supplement to a previous article (Aug. 1949 issue). Haas's experiences in the laboratory and plant are in substantial disagreement with the conclusions of MacMullen and Ozar. (L17, Zn)

593-L. Restoration of Ancient Bronzes and Other Alloys. *Metal Finishing,* v. 48, Aug. 1950, p. 66.

Electrolytic method developed by Colin Fink and Charles H. Eldridge for Metropolitan Museum of Art. (L17, T9, Cu)

594-L. Production Plating at Hall-Mack. Fred M. Burt. *Metal Finishing,* v. 48, Aug. 1950, p. 67-70.

Procedures and equipment of Los Angeles manufacturer of bathroom accessories. Mainly Zn and brass parts are plated with Cr and Ni. (L17, Cu, Zn, Cr, Ni)

595-L. Coatings Vs. Corrosion. *Paint, Oil & Chemical Review,* v. 113, Aug. 31, 1950, p. 24-25. Reprinted from *Paint Progress,* v. 8, No. 2.

Use of paint-type coatings for protection of offshore drilling platforms. (L26, T28, CN)

596-L. Applications, Precautions and Suggestions on the Proper Procedures for Hard Surfacing Manganese Steel. D. B. Rankin. *Industry & Welding,* v. 23, Sept. 1950, p. 36, 38, 66-67. (L24, AY)

597-L. Determination of Free Cyanide and Ammonia in Brass and Bronze Plating Baths. Part III. Experimental Evaluation of Present Methods and Recommended Procedure for Ammonia Determination. Samuel Heiman and F. Albert Cotton. *Plating,* v. 37, Sept. 1950, p. 939-944, 953. 26 references. (L17, S11, Cu)

598-L. Why Pay for Porosity Research? W. A. Wesley. *Plating,* v. 37, Sept. 1950, p. 949-950, 953.

Argues in favor of AES-sponsored research on porosity of electrodeposits. (L17)

599-L. Porcelain Enamels Steel in a Continuous Strip Operation. *Ceramic Industry,* v. 55, Sept. 1950, p. 72-74.

In making Mirawal, a porcelain-enameled light-gage steel, Baltimore Porcelain Steel Corp., uses a continuous, automatic operation for processing the metal. Mirawal is now bonded to Masonite to make a new porcelain-enamel building product. (L27, ST)

600-L. How To Metallize Glass and Other Ceramics. John Starr. *Ceramic Industry,* v. 55, Sept. 1950, p. 78-80, 105.

Miscellaneous procedures and applications. (L23)

601-L. Electroplating of Beryllium. M. Kolodney. *U. S. Atomic Energy Commission,* AECD-2845, Aug. 1950, 3 pages.

Surface preparation. Plating solutions and operation conditions for Ag, Au, Cd, In, and Sn plating. (L17, Be, Ag, Au, Cd, In, Sn)

602-L. Studies on the Surface Areas of Cadmium and Copper, and the Mechanism of Cadmium Polarization. J. M. Roxburgh and C. A. Winkler. *Canadian Journal of Research,* v. 28, sec. B, July 1950, p. 383-390.

Areas of mechanically cleaned Cd electrodes, measured by rate of build-up of hydrogen over-voltage, were shown to decrease with time of immersion in air-free acid solutions. The measured area depended upon the current used for the measurement, particularly with electrodes of large areas. Cu electrodes did not show similar effects. Cd polarization was linearly related to current, and independent of the measured area. This indicates that concentration polarization is operative in the deposition of Cd. (L17, Cd)

603-L. Potential of Cadmium in Sulphuric Acid. J. M. Roxburgh and C. A. Winkler. *Canadian Journal of Research,* v. 28, sec. B, July 1950, p. 391-394.

Potentials were found to be less negative than those reported for deposited electrodes. Cleaning under air-free conditions did not remove this difference. (L17, Cd)

604-L. A New Use for Wire To Replace Sand Blasting. *Wire Industry,* v. 17, Aug. 1950, p. 676.

Method in which cut steel wire replaces sand or shot. (L10, T5, CN)

605-L. Hot Dip Galvanizing; A Discussion on Residuals and Their Treatment. *Metal Industry,* v. 77, Aug. 18, 1950, p. 105-106.

Summarizes discussion at recent international conference at Copenhagen. (L16, Zn, CN)

606-L. Cleaning Metals by Blast. J. Lomas. *Machinery Lloyd* (Overseas Edition), v. 22, Aug. 19, 1950, p. 91-95.

Equipment and procedures. (L10)

607-L. Coating With Polythene. *British Plastics,* v. 23, Aug. 1950, p. 56-59.

Equipment and procedures for application to metals and nonmetals. (L26)

608-L. Vinyl Protection for Ships' Hulls. *British Plastics,* v. 23, Aug. 1950, p. 68-69.

Includes test-panel photographs. (L26, T22)

609-L. Contribution to the Study of Electrolytic Zinc Coatings. (In French.) Jean Ginguené. *Métaux & Corrosion,* v. 25, May 1950, p. 126-134.

Standard compositions of acid and alkaline baths used, influence of components on the process, technique of operation, and optimum conditions. (L17, Zn)

610-L. The Problem of Hard Zinc in Hot Galvanizing. (In German.) R. Haarmann. *Metalloberfläche,* v. 4, sec. A, Aug. 1950, p. 113-119.

Means for reducing the undesirable hard zinc formed during hot galvanizing. Economical methods of removing it from the bath and of utilizing it. (L16, Zn)

611-L. Anodes. (In German.) (Concluded.) Edmund R. Thews. *Metalloberfläche,* v. 2, sec. B, Aug. 1950, p. 115-117.

Use and production of brass anodes. Advantages of brass plating with pure copper anodes and Zn salts in the bath are described. (L17, Cu)

612-L. Electroplating and Metal Finishing Developments in Germany: 1940-1950. (In German.) Richard Springer. *Metalloberfläche,* v. 2, sec. B, Aug. 1950, p. 119-123.

100 references. (L17, L general)

613-L. Influence of Various Additions to the Hard-Chromium Plating Bath on Character of the Chromium Layer. (In Czech.) J. Doskar. *Hutnické Listy,* v. 5, June 1950, p. 240-247.

Value of certain additions is demonstrated. 22 ref. (L17, Cr)

614-L. The Analysis of Cadmium Cyanide Plating Solutions. Louis Silverman. *Metal Finishing,* v. 47, May 1949, p. 62-65.

Details of procedures. (L17, S11, Cd)

615-L. Submerged Abrasive Burnishing. Joseph E. Wingate. *Metal Finishing,* v. 47, May 1949, p. 55-61; June 1949, p. 72-78.

Application and principles of the process. Types of media and soaps. Part II: Detailed recommendations for parts handling, stone curing, selection of media sizes, work-load ratios, barrel speeds, etc. (L10)

616-L. Refinishing Hollow Ware. Joseph Haas. *Metal Finishing,* v. 47, June 1949, p. 79-82.

Recommended equipment and procedures. General instructions and details applicable to each of the base metals and electrodeposits ordinarily encountered. Includes polishing and stripping of old coatings. (L17)

617-L. Deposition of Metallic Films by Vacuum Methods. Samuel Wein. *Metal Finishing,* v. 47, July 1949, p. 42-46.

Equipment, procedures, and applications. 29 ref. (L25)

618-L. Carbonate Removal From Cyanide Plating Solutions. H. F. Ross. *Metal Finishing,* v. 47, July 1949, p. 47-48.

Improved procedure which involves treatment of the baths with calcium carbide. 10 ref. (L17)

619-L. Electrodeposition of Copper-Lead Alloys From Fluoborate Solutions. C. B. F. Young and Clifford Struyk. *Metal Finishing,* v. 47, July 1949, p. 49-50, 53.

While the authors report negative results, it is felt that the data developed will be of interest, and may possibly stimulate further research. (L17, Cu, Pb)

620-L. Finishing Surgical and Hospital Equipment at American Sterilizer Co. Walter Rudolph. *Metal Finishing,* v. 47, July 1949, p. 51-53.

Polishing and plating equipment and procedures. The finishing problem is one of extreme diversity as to size and shape, as well as types or kinds of finish. (L12, L17, T10)

621-L. Tin-Zinc Alloy Plating. P. J. Miller and J. W. Cuthbertson. *Metal Finishing,* v. 47, Aug. 1949, p. 44-49.

Equipment and procedures at British plant. The preferred composition is 75-80% Sn, balance Zn. Main application to date has been in the electrical industry. Other uses are under consideration. The coating appears to be suitable for all uses for which Cd has been employed. (L17, Sn, Zn)

622-L. A Critical Survey of Plating Practice for Zinc-Base Die-Castings. Joseph Haas. *Metal Finishing,* v. 47, Aug. 1949, p. 50-55.

Journal and patent literature. Present-day cleaning and plating practice. 25 ref. (L17, Zn)

623-L. High Pressure Sandblasting. Joseph Albin. *Metal Finishing,* v. 47, Aug. 1949, p. 56-57.

Rigorous control of sand and timing are combined with operating at higher air pressures to expedite a variety of cleaning jobs in an airlines maintenance shop. (L10)

624-L. Adsorption Phenomena in the Plating Room. H. A. Fudeman. *Metal Finishing,* v. 47, Aug. 1949, p.58-61.

Basic principles of adsorption. Present and potential application to electroplating. 15 ref. (L17, P13)

625-L. Future Outlook for Metals Used in the Plating Industry. *Metal Finishing,* v. 47, Aug. 1949, p. 62-63.

Taken from a report published by the Economic Cooperation Administration for the European Recovery Program. Covers Cu, Pb, Zn, Cd, Ni, and Sn.

(L17, A4, Cu, Pb, Zn, Cd, Ni, Sn)

626-L. Where Do We Go From Here? Part II. Electronics in Electroplating. Joseph B. Kushner. *Metal Finishing,* v. 47, Sept. 1949, p. 48-51, 74.

Possible future improvements in the electroplating process, including automatic plating-current control, automatic metal-content control, and automatic replenishment of brighteners. Circuit diagrams. (For Part I see Item 8-71, 1949.) (L17)

627-L. Immersion Plating of Zinc, Cadmium, and Tin on Aluminum Alloys. *Metal Finishing,* v. 47, Sept. 1949, p. 52-56. Condensed from "Deposition of Metals on Aluminum by Immersion From Solutions Containing Fluorides", by Samuel Heiman.

Previously abstracted from *Journal of the Electrochemical Society.* See item 7D-26, 1949. (L17, Al, Zn, Cd, Sn)

628-L. Sargent's New Finishing Department Exemplifies Close Co-ordination. Lawrence J. Durney. *Metal Finishing,* v. 47, Sept. 1949, p. 57-59.

Polishing, buffing and lacquering sections of Sargent and Co., manufacturers of builders hardware. (L10, L12, L26, T6)

629-L. Colorimetric Methods for the Analysis of Electroplating Baths. D. Gardner Foulke. *Metal Finishing,* v. 47, Oct. 1949, p. 58-63, 67.

Theory. Determination of Ni, Co, Pb, Fe, Mn, Cu, Cd, SiO_2, Al, and Zn in Ni-plating baths. 18 ref. (L17, S10, Ni)

630-L. Mechanical Surface Finishing—Tradition or Engineering? Ray Kessler. *Metal Finishing,* v. 47, Oct. 1949, p. 64-67.

Obstacles impeding full development of mechanized mechanical polishing. Several modern pieces of equipment. (L10)

631-L. High Speed Buffing of Screw Heads. *Metal Finishing,* v. 47, Oct. 1949, p. 74-75.

Previously abstracted from *Steel.* See item 7B-155, 1949. (L10, T7)

632-L. Blast Cleaning With Suspended-Abrasive Media. Edward Rosen. *Metal Finishing,* v. 47, Oct. 1949, p. 76-78, 80.

The process and some of its applications. (L10)

633-L. Gaseous Plating. *Metal Finishing,* v. 47, Oct. 1949, p. 79-80.

Equipment and procedure developed by Commonwealth Engineering Co., Dayton. Gaseous metal carbonyls deposit their metal content on the articles at 400° F. Dry method achieves high rates of deposition and permits processing of many materials not readily treated by conventional plating methods. (L25)

634-L. Metal Finishing Research at Battelle Institute. *Metal Finishing,* v. 47, Nov. 1949, p. 42-47.

Facilities and method of handling research projects. Practical results of some of Battelle's research in this field. (L general, A9)

635-L. Chemical Polishing. *Metal Finishing,* v. 47, Nov. 1949, p. 50, 52.

New process developed at Battelle Memorial Institute, whereby metal products can be given a bright, reflective surface without mechanical or electrical operations. Metals that can be chemically polished successfully include brass, copper, nickel-silver, monel, nickel, and aluminum. (L12)

636-L. Barrel Tumbling Practice on Yale Hardware. J. E. Charleson. *Metal Finishing,* v. 47, Nov. 1949, p. 51-52.

Brass and bronze castings are rolled wet in unlined barrels with sand and zinc slugs, to smooth rough surfaces, and then undergo dry tumbling to scour. Many machined parts are deburred by tumbling. (L10, Cu)

637-L. Hard Nickel Plating. M. H. Orbaugh. *Metal Finishing,* v. 47, Nov. 1949, p. 53-55, 59.

Compares hard Ni with hard Cr plating; various advantages and applications. Physical properties of the deposits, solutions and operating conditions, preparation of base metal, machining, and costs. (L17, Ni)

638-L. The Deposition of Copper From Phosphoric Acid Solutions. C. B. F. Young and Fred I. Nobel. *Metal Finishing,* v. 47, Nov. 1949, p. 56-59.

Object of investigation reported was to find a Cu complex with a P compound, other than the pyrophosphate, that would plate with superior results, operate at a pH close to neutral, plate directly on Fe without the use of a Cu "strike" solution, form a stable solution, and be cheap. Objectives were partially achieved. (L17, Cu, Fe)

639-L. Adhesion of Hard Nickel to High-Strength Aluminum Alloy. B. B. Knapp. *Metal Finishing,* v. 47, Dec. 1949, p. 42-46.

A method of electroplating a 7% Zn aluminum alloy with an adherent deposit of hard Ni. A new quantitative adhesion test developed for measuring the adhesion of Ni on Al sheet. 11 ref. (L17, Al, Ni)

640-L. Where Do We Go From Here? Part III. Water Control. Joseph B. Kushner. *Metal Finishing,* v. 47, Dec. 1949, p. 52-58, 67.

Possibilities of improvement in the electroplating process by more careful control of the composition and purity of the water used. 11 ref. (L17)

641-L. Electro-Polishing of Refrigerator Shelves. D. Chieger. *Metal Finishing,* v. 47, Dec. 1949. p. 59-62, 69.

Equipment, procedures, and solutions for stainless shelves made by L. A. Young Spring & Wire Corp., Detroit. (L13, SS)

642-L. Automatic Plating at the E. Ingraham Co. W. A. Raymond. *Metal Finishing,* v. 47, Dec. 1949, p. 63-67.

Equipment and procedures of a

clock and watchmaker. Bright Ni, Brass, or Cr are applied to any one of three base metals used (steel, brass, or nickel silver). (L17, Cu, Ni, Cr, ST)

643-L. Blastcleaning Stainless Steel Castings. Herbert Gibbs. *Metal Finishing*, v. 47, Dec. 1949, p. 68-69.

Equipment and procedures of Cooper Alloy Foundry Co., as applied to stainless, nickel and monel. (L10, SS, Ni)

644-L. Important Developments in Metal Finishing During 1949. Walter A. Raymond. *Metal Finishing*, v. 48, Jan. 1950, p. 46-55, 108.

171 references. (L general)

645-L. Practical Yellow Gold Plating. Jerome L. Bleiweis. *Metal Finishing*, v. 48, Jan. 1950, p. 63-68.

The problem of producing gold of the desired color and brilliance. Typical plating cycles for the base metals brass, steel, Zn (die castings), Al, and Pb. Color-control procedures; also solution of several plating difficulties. (L17, Au)

646-L. Radioactive Tracers Used To Study Plating Process. *Metal Finishing*, v. 48, Jan. 1950, p. 69. Condensed from "Experiments in Chromium Electrodeposition With Radioactive Chromium", Fielding Ogburn and Abner Brenner.

Previously abstracted from *Journal of the Electrochemical Society*. See item 23-L, 1950. (L17, Cr)

647-L. Calculating Metal Cost in Plating Cadmium. *Metal Finishing*, v. 48, Jan. 1950, p. 74.

A nomogram. (L17, Cd)

648-L. Diversified, Modern Job-Shop Plating. Fred M. Burt. *Metal Finishing*, v. 48, Feb. 1950, p. 42-45.

Plant of Cadmium & Nickel Plating Co., Los Angeles. (L17)

649-L. The Analysis of Chrome Plating Solutions. Louis Silverman. *Metal Finishing*, v. 48, Feb. 1950, p. 46-54.

A method for determination of both chromic acid and trivalent Cr said to be much more rapid than those in common use in most plating laboratories. An interesting new theory regarding the role played by the H_2SO_4 catalyst in Cr plating. (L17, S11, Cr)

650-L. West Coast Electroplating Industry. Elburn Marcum. *Metal Finishing*, v. 48, Feb. 1950, p. 63-66.

A survey. (L17)

651-L. Calculating Metal Cost in Gold Plating. *Metal Finishing*, v. 48, Feb. 1950, p. 71.

A nomogram. (L17, Au)

652-L. Electrolytic Polishing of Metallic Surfaces. Pierre A. Jacquet. *Metal Finishing*, v. 47, May 1949, p. 48-54; June 1949, p. 83-92; July 1949, p. 58-64; Sept. 1949, p. 60-67; Oct. 1949, p. 68-73; v. 48, Jan. 1950, p. 56-62; Feb. 1950, p. 55-62.

Part I. Fundamental phenomena accompanying the electropolishing of metals. Part II: Commercial procedures in general, on the basis of the literature. Part III: Scientific and industrial applications in general. Part IV: Uses in metallography. Part V: The phenomena of corrosion, oxidation, and passivation; ion exchange, magnetic properties and surface electrical conductivity; and electron emission by metals. Part VI: Use in study of hardness and microhardness, interfacial diffusion, and friction and wear; commercial applications. Final installment: Electrolytic superfinishing and electropolishing as an intermediate stage in manufacturing. About 500 ref. (L13, M21)

653-L. Laboratory Investigations on Metal Cleaning. Samuel Spring. *Metal Finishing*, v. 48, Mar. 1950, p. 67-72, 74.

Results of a fundamental study of the process of oil removal from metal surfaces, using an alkaline-silicate cleaner containing a surface-active agent. Carefully processed metal panels were cleaned under controlled conditions of time, temperature, agitation, and concentration of cleaner. A "cleaning index" is obtained from the average of ten observations. Effects of oxide coating, surface roughness, and oil composition were studied. (L12)

654-L. Some Notes on the Electroplating of Powder Metallurgy Parts. Henry H. Hausner. *Metal Finishing*, v. 48, Mar. 1950, p. 73-74.

Methods, mainly on the basis of the literature. (L17)

655-L. The Use of Glycerine in Electropolishing. Milton A. Lesser. *Metal Finishing*, v. 48, Mar. 1950, p. 75-77.

A review. 17 ref. (L13)

656-L. New Abrasive Methods Cut Costs. Stan L. Johnson. *Metal Finishing*, v. 48, Mar. 1950, p. 78-80.

Prefinishing, belt-finishing operations, reconditioning rusted steel stock, and other modern polishing techniques. (L10)

657-L. Calculating Metal Cost in Silver Plating. *Metal Finishing*, v. 48, Mar. 1950, p. 83.

A nomographic chart. (L17, Ag)

658-L. Electroforming—A Versatile, Precision Production Method. Benjamin Melnitzky. *Metal Finishing*, v. 48, Apr. 1950, p. 44-48.

The process and varied applications. (L18)

659-L. Development of Alkaline Cleaners. Robert H. Tiers. *Metal Finishing*, v. 48, Apr. 1950, p. 49-53.

Historical review; formulation and testing of alkaline cleaners. New test procedure called the "swirl method". (L12)

660-L. Electroplated Tin-Zinc Alloy Coatings on Iron and Steel. E. E. Halls. *Metal Finishing*, v. 48, Apr. 1950, p. 54-58, 62.

Previously abstracted from *Metallurgia*. See item 93-L, 1950. (L17, Sn, Zn, ST)

661-L. Production Chrome Plating of Hand Tools. Fred M. Burt. *Metal Finishing*, v. 48, Apr. 1950, p. 59-62.

Equipment and procedures of Proto, Los Angeles. (L17, T6, Cr)

662-L. Calculating Metal Cost in Tin Plating. *Metal Finishing*, v. 48, Apr. 1950, p. 74.

A nomographic chart. (L17, Sn)

663-L. United Chromium's Metal Finishing Laboratory. *Metal Finishing*, v. 48, May 1950, p. 67-69.

New Detroit research center. (L general, A9)

664-L. Electropolishing With Hexafluorophosphoric Acid. H. F. Martin and C. B. F. Young. *Metal Finishing*, v. 48, May 1950, p. 70-74.

Use of above reagent for electropolishing of stainless and carbon steel, brass, and nickel silver was investigated. H_2SO_4, H_3PO_4, and H_2CrO_4 were also investigated in combination with hexafluorophosphoric acid. Good results were obtained with stainless steel and nickel silver. Brass polishing was only fair, and hot rolled steel could not be polished. (L13, CN, SS, Cu)

665-L. Calculating Metal Cost in Nickel Plating. *Metal Finishing*, v. 48, May 1950, p. 83.

A nomographic chart. (L17, Ni)

666-L. The Determination of Impurities in Nickel Plating Solutions. Parts I and II. Louis Silverman. *Metal Finishing*. v. 48, May 1950, p. 59-63, 66; July 1950, p. 50-55.

Part I: Detailed procedures for Al, NH_4 ion, Cd, Cr, and Co. Part II: Procedures for Cu, Fe, Pb, Mg, and Zn. (L17, S11)

667-L. Complex Compounds in Industrial Electroplating. Part 1. Seymour Senderoff. *Metal Finishing*, v. 48, July 1950, p. 59-64.

The nature of complexes, functions of complexes in plating, complexes in Cu plating, and complexes in Ni plating. 36 ref. (To be continued.) (L17)

668-L. The Customer Looks at Plated Products. Thor H. Westby and Robert E. Parkinson. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 29-32; discussion, p. 32-33.

Quality specifications from the distributor's viewpoint. Plating thickness and salt-spray corrosion resistance. (L17, S22)

669-L. Process Control of Electroplating. Russel E. Harr. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 35-44; discussion, p. 44-45.

Maintenance of equipment, cleaning solutions, and plating solutions. Spectrographic tests of plating solutions, methods of measuring coating thickness, and recording charts for process and product measurements. (L17)

670-L. Availability of Plating Materials. I. Alkalies, Including Silicates and Phosphates. J. J. Duffy, Jr. **II. Cadmium.** L. V. Nagle. **III. Chromic Acid and Chromates.** Henry Mahlstedt. **IV. Cyanides.** E. W. McGovern. **V. Lead.** Charles R. Ince. **VI. Nickel.** Clarence H. Sample. **VII. Tin.** R. J. Nekervis. **VIII. Zinc.** Ralph F. Burns. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 53-61. (L17, A4)

671-L. PR Cyanide Copper Plating. George W. Jernstedt. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 63-67; discussion, p. 76-78.

See abstract of "Brighter Finishes With 'PR' Plating", *Steel*, item 307-L, 1950. (L17, Cu)

672-L. Electrodeposition of Nickel at High Current Density. W. A. Wesley, W. W. Sellers, and E. J. Roehl. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 79-92; discussion, p. 92.

The literature and new experiments on theoretical limiting current density. It was found that limiting current density for sound Ni deposits increases approximately linearly with rate of flow of electrolyte over cathode surface, that at current density of 4260 asf., a Ni deposit 0.001 in. thick is formed in 16 sec.; that the Watts bath suffers serious disadvantages compared with the chloride bath; that at limiting current densities both anode and cathode efficiencies are still approximately 100%; and that these coatings are less ductile and slightly harder than those made at normal rates. 22 ref. (L17, Ni)

673-L. Some Factors That Influence the Operating Characteristics of Chromium Plating Baths. R. O. Hull and J. B. Winters. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 93-100; discussion, p. 100-101.

Experimental study of chromium plating of buffed Watts gray Ni, and also bright Ni, and of factors relating to passivity, including means for overcoming it. (L17, Cr, Ni)

674-L. Scratch Hardness and Abrasion Hardness of Electrodeposited Chromium. J. M. Hosdowich. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 103-125; discussion, p. 126.

Plating procedure and hardness tests. Correlation between hardness and appearance. 19 ref. (L17, Q29, Cr)

675-L. Acid Dips in Cleaning Cycles. A Round Table Discussion. I. Acid

Dips for Low Carbon Steel. II. Acid Dips for High Carbon Steel. III. Acid Dips for Copper and Copper Base Alloys. IV. Acid Dips for Zinc Base Alloys. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 127-147.

Each part has an introduction by a separate author. Introduction to Part I includes 30 ref. (L12, CN, Cu, Zn)

676-L. Plating on Aluminum Alloys. Fred Keller and Walter G. Zelley. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 149-162; discussion, p. 189-191.

A general discussion, considering Al alloy structure, preplating treatments, plating procedure, resulting finishes, and finish testing. 11 ref. (L17, Al)

677-L. Cleaning, Etching, Chemical Polishing and Brightening of Aluminum. Walter R. Meyer and Steven H. Brown. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 163-188; discussion, p. 189-191.

Organic and alkali cleaners, effects of additives on NaOH reaction with Al, acid treatment, inhibitors in acid solutions, etching to produce a dead white surface, and effects of various treatments on cell potentials of wrought alloys. Theory of acid brightening and polishing of wrought alloys. 11 ref. (L12, Al)

678-L. Amorphous Phosphate Coatings for Protection of Aluminum Alloys and for Paint Adhesion. Alfred Douty and F. P. Spruance, Jr. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 193-216; discussion, p. 216.

Coating process and characteristics of Alodine. Compares it with better known coatings. 16 ref. (L14, Al)

679-L. Electroplating Magnesium and Its Alloys. H. K. DeLong. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 217-226; discussion, p. 226-227.

Process in which an immersion zinc coating is applied followed by copper striking and electroplating in standard plating baths. (L17, Mg)

680-L. Distribution of Electrodeposited Metal on Some Simply Shaped Cathodes. John Kronsbein and Lester C. Morton. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 229-238; discussion, p. 239.

Distribution in relation to part design. (L17)

681-L. Outstanding Problems of Porous Structure in Electrodeposits. N. Thon. *Proceedings of the American Electroplaters' Society*, v. 36, 1949, p. 241-247; discussion, p. 247-249.

Outlines A.E.S. Research Project No. 6. Problems involved and approaches being made to their solution. (L17)

682-L. Surface Finish and the Designer. Roy P. Trowbridge. *Product Engineering*, v. 21, Sept. 1950, p. 122-127.

Practical aspects of a new approach to the measurement, specification, and application of surface-finish control of metallic parts. Types of instruments, standards for various production methods, and phvsical properties relating to condition of the metallic surface are compared and evaluated. (L15)

683-L. Barrel Finishing. L. Mable. *Electroplating and Metal Finishing*, v. 3, Sept. 1950, p. 479-482.

Precise recommendations for the treatment of specific metal parts. (L10)

684-L. Intrinsic Porosity. *Electroplating and Metal Finishing*, v. 3, Sept. 1950, p. 487-490.

Intrinsic porosity is an extremely fine form of porosity. Such fine pores are damaging to an electrodeposit, because they are invariably filled with chemicals from the plating solution which accelerate corrosion. Why such pores are inevitable in an extremely thin electrodeposit, and the possibilities of eliminating them from electrodeposits of commercial thickness. (To be continued.) (L17)

685-L. Depositing Lead-Indium Alloys From Organic Perchlorate Electrolytes. *Electroplating and Metal Finishing*, v. 3, Sept. 1950, p. 501.

Recent British patent. Conditions for 3 and 5% In deposits and also for one containing 42% Pb, 42% Sn, and 16% In. (L17, In, Pb, Sn)

686-L. Liquid Blasting Cuts Cost of Reconditioning Die-Casting Dies. Albert G. Lintel. *Machinery* (American), v. 57, Sept. 1950, p. 170-174.

"Hydro-Finish" process in which a very fine abrasive, suspended in a liquid, is delivered to a blasting nozzle by means of a circulating pump. (L10)

687-L. The Metal Under the Plate. Howard E. Boyer. *Products Finishing*, v. 14, Sept. 1950, p. 14-20, 22.

Electroplating variables related to composition and condition of the base metal. Considers ferrous and nonferrous metals, with emphasis on steels and cast irons. Effects of microstructure on the alloying process which accompanies formation of good quality electrodeposits. (L17)

688-L. Modern Masking Materials and Methods for Fabrication and Spray Finishing. Part II. Pressure-Sensitive Tapes, Die-Cut Stencils, Papers—Applications and Uses. Arthur P. Schulze. *Products Finishing*, v. 14, Sept. 1950, p. 26-36, 38, 40. (L26)

689-L. Color Lithography Process for Large Steel Drums. *Products Finishing*, v. 14, Sept. 1950, p. 46-48, 50, 52.

Process developed by Rheem Mfg. Co. (L26)

690-L. Anodic Treatment of Manufactured Products. P. Smith and P. Shaw. *Light Metals*, v. 13, Aug. 1950, p. 449-452.

Effects of chemical composition, state of the metal (sand, gravity or pressure cast, wrought, degree and type of working, etc.), and design, upon the quality of the resulting finish. (To be continued.) (L19, Al)

691-L. Some Investigations on Black Oxide Finishes. H. Silman and B. E. Love. *Journal of the Electrodepositors' Technical Society*, v. 25, 1950, p. 65-75; discussion, p. 75-76. (Preprint.)

Finishes produced from a solution of NaOH, $NaNO_3$, and $Na_2C_2O_7$. Methods of measuring film thickness. Protective value to Ni-Cr and plain carbon steels. Coating consisted of Fe_3O_4. (L14, AY, CN)

692-L. (Book) Protective Coatings for Metals. J. W. Gailer and E. J. Vaughan. 261 pages. 1950. Charles Griffin & Co., Ltd., London. 24s net.

Chemical and physical properties, durability and inspection as well as mode of formation under each type of coating. Two main sections covering metallic and nonmetallic coatings, supplemented by appendices on inspection methods and by tables. (L general)

693-L. (Book) Enameling on Copper and Other Metals. Thomas E. Thompson. 1950, 38 pages. Thomas C. Thompson Co., 1205 Deerfield Rd., Highland Park, Ill. $1.00.

Tools and equipment used in enameling, preparation of the enameling metal, enamel application, and firing and finishing. The standard forms of art enameling. Short bibliography. (L27, Cu)

M

METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURES

248-M. The Coordinate Scheme in Crystalline Boron. T. N. Godfrey and B. E. Warren. *Journal of Chemical Physics*, v. 18, Aug. 1950, p. 1121-1122.

Results of Fourier analysis of X-ray powder-diffraction study. The radial distribution curve is plotted. (M22, B)

249-M. A Statistical Partial Treatment of the Orientation of Two-Dimensional Binary Solid Solutions. (In German.) Iris Runge. *Annalen der Physik*, ser. 6, v. 7, May 20, 1950, p. 240-247.

Mathematical analysis. (M24)

250-M. Density and Lattice Structure of the Compounds Mg_2Pb, Mg_2Sn, and Mg_2Ge. (In German.) Georg Brauer and Joachim Tiesler. *Zeitschrift für Anorganische Chemie*, v. 262, June 1950, p. 319-327.

Experimental procedure, physical properties, and crystal structure of the above compounds. 16 ref. (M26, P10, Mg, Pb, Sn, Ge)

251-M. The Compounds LiMgP, LiZnP, and LiZnAs. (In German.) H. Nowotny and K. Bachmayer. *Monatshefte für Chemie und verwandte Teile anderer Wissenschaften*, v. 81, June 15, 1950, p. 488-496.

Preparation and X-ray studies of above compounds as well as some of their physical properties. The arsenide is metallic in character. (M26, Li, Mg, Zn)

252-M. X-Ray Interferences of Materials With Hydrostatic Lattice Distortions. (In German.) Rolf Hosemann. *Zeitschrift für Physik*, v. 128, June 20, 1950, p. 1-35.

Results of theoretical analysis of the above. 37 ref. (M26)

253-M. Conditions for Formation of Intermetallic Phases of Types of $MgCu_2$, $MgZn_2$, and MgNi$_2$. (In Russian.) P. I. Kripyakevich and E. E. Cherkashin. *Uspekhi Khimii* (Progress in Chemistry), v. 19, May-June 1950, p. 361-378.

Reviews above, on basis of the literature and the authors' experiments. 59 ref. (M26, Mg, Cu, Zn, Ni)

254-M. Exact Metallurgical Control of Aluminum Alloy Macrostructure Eliminates Warpage. *Steel*, v. 127, Aug. 28, 1950, p. 90.

Results of studies by the Harvey Machine Co. It was found that a macrostructure consisting of uniformly small grains results in minimized distortion during machining operations. (M28, G17, Al)

255-M. Metal Fractures Modeled by Other Materials. A. M. Sullivan and J. A. Kies. *Journal of Metals*, v. 188, Sept. 1950, p. 1090-1091.

Photomicrographs show similarity of fracture structures between various metallic and nonmetallic materials. Importance of distinguishing between markings characteristic of the material under observation and those characteristic of fracture itself. (M27, Q26)

256-M. The Structure of Intermediate Phases in Alloys of Titanium With Iron, Cobalt, and Nickel. Pol Duwez and Jack L. Taylor. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1173-1176.

Results of investigation compared with those previously published. (M26, Ti, Fe, Co, Ni)

257-M. The Insides of Metals. Carl A. Zapffe. *Physics Today*, v. 3, Sept. 1950, p. 13-19.

Work of the author using the microscope technique known as "fractography". Practical and fundamental results. "Micellar" theory proposed by the author. (M23)

258-M. The Borides of Uranium and Thorium. Leo Brewer and others. *U. S. Atomic Energy Commission*, AECD-2823, Feb. 14, 1950, 6 pages.

The phases of the U-B and Th-B systems were investigated by means of X-ray powder diffraction patterns of samples 25-85 at. % B. Results are discussed. (M26, B, Th, U)

259-M. The Electron Microscope in Metallurgy. Alfred L. Ellis. *Year Book of the American Iron and Steel Institute*, 1950, p. 398-414; discussion, p. 414-422.

Previously abstracted from preprint. See item 168-M, 1950. (M21, CN, AY)

260-M. A High-Low Temperature Microscope Stage. R. E. Cech. *Review of Scientific Instruments*, v. 21, Aug. 1950, p. 747-749.

Stage which permits microscopic observation of metal specimens from the temperature of liquid nitrogen to an upper temperature usually determined by the melting point of the specimen. It consists of a vacuum-tight copper chamber cooled by water or liquid nitrogen, in which the specimen is heated electrically. A quartz window permits "at temperature" observation of the specimen. 11 ref. (M21)

261-M. Ultra-Violet Photography of Hot Metal Surfaces. G. A. Jones. *Photographic Journal*, v. 90B, July-Aug. 1950, p. 99, 81.

Techniques employed. Photographs show results of photographing the same piece of metal at the same temperature by its own radiation on a panchromatic plate; by means of a 500-watt mercury lamp; and by means of a blue filter and intense white lighting. (M21)

262-M. Flash Radiography. C. G. Pollitt. *Photographic Journal*, v. 90B, July-Aug. 1950, p. 104-107; discussion, p. 107-109.

Development of the X-ray tubes and associated electrical equipment for taking radiographs using an exposure time of one microsecond or less. A brief reference is made to kineradiography using extremely short exposure times. Includes radiographs and circuit diagrams. (M23, S13)

263-M. The Quaternary System Aluminium-Iron-Cobalt-Nickel, With Reference to the Role of Transitional Metals in Alloys. G. V. Raynor and M. B. Waldron. *Proceedings of the Royal Society*, ser. A, v. 202, Aug. 7, 1950, p. 420-438.

Compares theoretical and experimental results. (M24, Al, Co, Fe, Ni)

264-M. An Autoradiographic Method for Study of Segregation in Steels. (In French.) André Kohn. *Comptes Rendus* (France), v. 230, June 19, 1950, p. 2201-2203.

A new method using a radioactive alloy, or by subjection of the sample to radiation of thermal neutrons in the atomic pile. Results of a typical investigation. (M23, ST)

265-M. Structure of Light Alloys for Casting. (In French.) Louis Grand. *Fonderie*, June 1950, p. 2081-2089.

Microstructure, mechanism of crystallization, conditions of melting, solidification of metal in the mold, and development of the grains for seven different Al alloys. (M27, N12, Al)

266-M. Study of Imperfect Crystals by Powder Photographs. A. J. C. Wilson. *Research*, v. 3, Sept. 1950, p. 394-399.

A review, illustrated with diagrams. 67 ref. (M26)

267-M. (Book) **Contribution a l'Emploi des Methodes Optiques en Metallographie Microscopique** (Use of Optical Methods in Metallographic Microscopy). T. Cambon. 107 pages. 1949. Publications Scientifiques et Techniques du Ministere de l'Air, 2 rue de la Porte d'Issy, Paris, France. 500 fr.

Thesis of this book is that a great deal can be learned, both as to the nature of the phases and as to their crystallographic characteristics, by examination in the unetched condition, using normally incident polarized light and a crossed analyzer. Regards the reflecting power of an opaque material as of interest equal to that of the refractive index of a transparent material. Characteristics of the phases in the Cu-Sn systems and of about 24 silicides. Theory and practical details of the technique. (From review in *Metal Industry*.) (M21)

268-M. (Book) **Materiewellen und ihre Interferenzen.** (Material Waves and Their Interferences.) M. von Laue. 392 pages. 1948. Akademische Verlagsgesellschaft, Geest & Portig K. G., Leipzig, Germany.

A brief historical outline of the electron and wave theory of matter; advanced theoretical and mathematical work in this field. (M25)

N
TRANSFORMATIONS AND RESULTING STRUCTURES

174-N. The Kinetics of the Zirconium-Nitrogen Reaction at High Temperatures. Andrew Dravnieks. *Journal of the American Chemical Society*, v. 72, Aug. 1950, p. 3568-3571.

The reaction was investigated from 362 to 1043° C. and from 10 to 300 mm. N_2 pressure. Data and apparatus. (N15, Zr, N)

175-N. Microscopic Observation of the Solidification of Small Metal Droplets. D. Turnbull and R. E. Cech. *Journal of Applied Physics*, v. 21, Aug. 1950, p. 804-810.

Experimental procedure and results for a variety of metals. Effect of type of atmosphere. 11 ref. (N12, M26)

176-N. Order-Disorder in Hexagonal Lattices. (In English.) R. M. F. Houtappel. *Physica*, v. 16, May 1950, p. 425-455.

Some relations for the partition functions of two-dimensional infinite triangular and honey-comb lattices with Ising interaction between neighbors without a magnetic field, for the general case of different interactions in the three directions. Exact evaluation of these partition functions is obtained with the aid of the method of Bruria Kaufman. Some thermodynamic properties of the isotropic hexagonal lattices are compared with corresponding properties of the quadratic lattice. 12 ref. (N10)

177-N. The Exchange of Magnesium by Lithium or Sodium in Magnesium Plumbide. (In German.) Georg Brauer and Joachim Tiesler. *Zeitschrift für Anorganische Chemie*, v. 262, June 1950, p. 309-318.

Experiments made to determine the solubility of $Na_{15}Pb_4$ in the fluorite lattice of Mg_2Pb gave negative results. 8-10% Li_4Pb is soluble in Mg_2Pb, and even up to 42% Li_4Pb, the X-ray retains its identity. 15 ref. (N12, Mg, Pb, Li, Na)

178-N. Subcritical Graphitization Can be Controlled. B. F. Brown. *Iron Age*, v. 166, Aug. 31, 1950, p. 64-68.

Mechanism of the phenomenon, which is said to be rather common and to be of importance in all applications of carbon steels as stressed members at temperatures above 750° F. A few critical experiments which serve to define quantitatively the principles involved. (N8, CN)

179-N. On the Martensitic Transformation at Temperatures Approaching Absolute Zero. S. A. Kulin and Morris Cohen. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1139-1143.

Plastic deformation and straight-cooling experiments on 18-8 and 1% C, 20% Ni steels demonstrate that the martensitic transformation proceeds with characteristic rapidity even at temperatures approaching absolute zero. These results indicate that the atom-by-atom growth mechanism for martensite formation is invalid, at least in the alloys studied. 16 ref. (N8, SS, AY)

180-N. Migration of Carbon in Steel Under the Influence of Direct Current. P. Dayal and L. S. Darken. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1156-1158.

Improved method for study. Electrolytic migration and ordinary diffusion are not necessarily coupled as in the weld method. Extent of migration is determined by combustion analysis for carbon. Equipment is shown schematically. Micrographs show structures at various points. (N1, ST)

181-N. Present Knowledge of Low-Carbon 18-8. H. W. Gillett. *American Society for Testing Materials*, "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 41-54; discussion, p. 55.

Reviews data from the literature on austenite stability, carbide precipitation, weldability, and corrosion resistance. Effect of grain size, rolling reduction, and C, N_2, Cr, Ni, Cu, Mn, Si, O_2, Mo, and B content. Competence of conventional methods for evaluating sensitization and corrosion-resistance. 46 ref. (N8, R general, K9, SS)

182-N. Diffusion Coefficient of C in α-Iron. C. A. Wert. *Physical Review*, ser. 2, v. 79, Aug. 15, 1950, p. 601-605.

An equation is developed for interstitial diffusion in cubic lattices, using a classical statistical-mechanical treatment. Measurements of carbon in α-iron were made from −35 to 200° C. Combined with earlier data they extend the knowledge of diffusion in this system from 10^{-20} to 10^{-6} sq. cm. per sec. (N1, Fe)

183-N. Thermomagnetic Transformations of Iron-Carbon-Nitrogen Alloys. (In French.) Jacques Pomey, Francois Goutel, Jacques Moulin, and Raymond Coudray. *Comptes Rendus* (France), v. 230, June 19, 1950, p. 2196-2198.

Thermomagnetic study of Fe-C-N alloy wires obtained by gaseous cementation and diffusion revealed reversible transformations of austenite into cementite (Fe_3C), and nitride (Fe_4N). (N8, Fe)

184-N. Electron-Diffraction Study of Cementation of Iron. (In French.)

Jean-Jacques Trillat and Shigueo Oketani. *Comptes Rendus* (France), v. 230, June 19, 1950, p. 2203-2205.

Methods and results of study of mechanism of cementation and formation of Fe_3C. Typical patterns are illustrated. (N8, J28, Fe)

185-N. Influence of Gas Adsorption on Polymorphic Transformations. (In French.) Hubert Forestier and Jean-Pierre Kiehl. *Comptes Rendus* (France), v. 230, June 26, 1950, p. 2288-2290.

Shows that variation of transformation temperature of pulverized solids is a function of the gas present. This variation is related to the phenomenon of surface adsorption on the crystalline lattice. The following transformations were studied: $\alpha \rightarrow \beta$ for Tl and SnO_2; orthogonal to rhombic for KNO_3; orthogonal to hexagonal for $AgNO_3$; and $\alpha \rightarrow \gamma$ for Fe and eutectoid steel (0.8% C). The gases He, H_2, Ne, N_2, A, O_2, CO_2, and air were used. (N6, EG-m)

186-N. Kinetics of Decomposition of Austenite in Iron-Carbon-Nitrogen Alloys. (In French.) Jacques Pomey, Raymond Coudray, and Francois Goutel. *Comptes Rendus* (France), v. 230, June 26, 1950, p. 2298-2300.

Study of the above in Fe-C-N alloys, obtained by gaseous cementation and homogenization of iron wires, showed that N_2 slows down considerably the rate of nucleation of α-Fe and the rate of linear crystallization. The Ar_3 point is also lowered by the action of nitrogen. Practical aspects. (N8, ST)

187-N. Grain Development in Cast Light Alloys. (In French.) Louis Grand. *Revue de l'Aluminium*, v. 27, June 1950, p. 217-225.

Influence of melting and casting conditions on macrographic structure and effect of modifications of this structure on the quality of light-metal castings. Melting and casting temperatures, speed of solidification, and presence of certain elements have an important effect on grain size. Resistance to static stresses, ability to withstand mechanical deformation, machinability, and anodization vary with structure of the metal. (N3, E25, Al)

188-N. Investigation of the Disorder-Order Transformation Order in Cu_3Au Alloy on the Basis of Electrical Fluctuations. (In Russian.) E. Ya. Pumper. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, June 21, 1950, p. 1033-1036.

A previously proposed method for investigation of microscopic processes taking place in a metallic conductor by measurement of the level of emf. fluctuations was verified for the Cu_3Au alloy. (N10, Cu, Au)

189-N. $\alpha \rightleftarrows \gamma$ Transformation in the System Iron-Chromium-Manganese. (In Russian.) *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, June 1950, p. 566-574.

Results of extensive investigation, using determinations of hardness, microstructure, and thermal expansion. 10 ref. (N8, Fe, Cr, Mn)

190-N. Importance of the Weichelt Diagram in the Production of Pearlite Cast Iron. (In Dutch.) M. Stap. *Metalen*, v. 4, June 1950, p. 201-212.

Use of the Weichelt C-Si diagram in the production control of cast irons. (N8, E25, CI)

191-N. Formation of Edge Fracture in Blackheart Malleable Iron. (In Czech.) Jiri Celeda and Marie Rysava. *Hutnické Listy*, v. 5, June 1950, p. 221-227.

Study of above defect shows that it is caused by occurrence of decarburization during the incubation period of graphitization of the cementite. The principal factor is, therefore, malleabilizability of the iron. All factors increasing the incubation period promote edge fracture, and vice versa. 11 ref. (N8, CI)

192-N. Transformation of Austenite in a Manganese-Molybdenum Steel Deposited as Weld Metal. O. O. Miller, F. C. Kristufek, and R. H. Aborn. *Welding Journal*, v. 29, Sept. 1950, p. 450s-458s.

The isothermal transformation diagram was determined and from it a cooling transformation diagram was derived and correlated with cooling rates in typical weld deposits and in heat treated steel plate. Supplementary data comprise the hardness and microstructure of an end-quenched hardenability bar, Ae_3 and Ae_1 temperatures, and calculated Ms temperature. 16 ref. (N8, AY)

193-N. The Thermodynamics and Kinetics of Precipitation in Solid Solutions. H. K. Hardy. *Journal of the Institute of Metals*, v. 77, July 1950, p. 457-488.

Factors governing diffusion, fluctuations, and nucleation are briefly outlined to show the manner in which the precipitation process is controlled by free energy/composition and free energy/structure relationships. 40 ref. (N7, P12)

P

PHYSICAL PROPERTIES AND TEST METHODS

261-P. The Rapid Determination of Relative Thermal Conductivities. Malcolm G. McLaren. *American Ceramic Society Bulletin*, v. 29, July 1950, p. 252.

Method using "Tempilstiks" (crayons which melt at definite temperatures). Essence of the method is the maintenance of a cold and hot end on the body being tested while streaking from one end to the other with the Tempilstik. The distance from the hot end to the point of melting is a measure of thermal conductivity. (P11)

262-P. Conductivity of Liquid Selenium—200°-500° C. Herbert W. Henkels. *Journal of Applied Physics*, v. 21, Aug. 1950, p. 725-731.

Se was found to be an ideal semiconductor of electricity in this range. 10 ref. (P15, Se)

263-P. Densities of Liquid and Solid Indium. D. D. Williams and R. R. Miller. *Journal of the American Chemical Society*, v. 72, Aug. 1950, p. 3821.

Procedures for determination and results. (P10, In)

264-P. A Thermodynamic Study of Liquid Metallic Solutions. II. The System Tin-Gold. O. J. Kleppa. *Journal of the American Chemical Society*, v. 72, Aug. 1950, p. 3346-3352.

Activities and "entropy fractions" for Sn in liquid Sn-Au mixtures were determined by the electromotive force method for compositions up to 78 at. % Au. Activities at 600° C., "entropy fractions", and relative partial molar and integral heats of mixing are calculated. This system shows a very large negative deviation from Raoult's law, consistent with the presence of stable intermetallic phases which give rise to a maximum in the binary phase diagram. Presence of a certain degree of short-range order is indicated. 22 ref. (P12, M24, Sn, Au)

265-P. The Solubility of Iron in Mercury at 25-700°. A. L. Marshall, L. F. Epstein, and F. J. Norton. *Journal of the American Chemical Society*, v. 72, Aug. 1950, p. 3514-3516.

Solubility was determined and an equation developed to express the results. Apparatus and procedure. (P13, Fe, Hg)

266-P. Thermal Expansion of Solids. Peter Hidnert and Wilmer Souder. *Bureau of Standards*, Circular 486, Mar. 15, 1950, 29 pages.

Ten methods for determining thermal expansion. Procedures used in determining expansion equations and coefficients of expansion of materials. Relations between thermal expansion, temperature, chemical composition, density, compressibility, specific heat, melting point, atomic weight, and other properties of materials. 59 ref. (P11)

267-P. Density of Solids and Liquids. Peter Hidnert and Elmer L. Peffer. *Bureau of Standards*, Circular 487, Mar. 15, 1950, 29 pages.

Defines density and specific gravity. Eleven methods (hydrostatic weighing, picnometer, flotation, hydrometer, falling drop, balanced column, Boyle's law, electromagnetic, elastic helix, ice calorimeter, and volumetric) for determining densities of solids and liquids; the accuracy of various methods. 79 ref. (P10)

268-P. The Electrical Conductivity of Bismuth Fibres. II. Anomalies in the Magneto-Resistance. B. Donovan and G. K. T. Conn. *Philosophical Magazine*, ser. 7, v. 41, Aug. 1950, p. 770-782.

In examining the magneto-resistance of thin fibres of Bi, which are known from previous work to be approximately single crystals, it was found that about 10% of them showed a decrease in resistance on application of a magnetic field. Influence of direction of current, direction of field, and orientation of the crystal axes. Evidence of the existence of a longitudinal Hall coefficient. If used in conjunction with the theory of conduction in anisotropic solids, it is possible to indicate the appropriate crystal orientation. 12 ref. (P15, M23, Bi)

269-P. Energies and Widths of Domain Boundaries in Ferromagnetics. B. A. Lilley. *Philosophical Magazine*, ser. 7, v. 41, Aug. 1950, p. 792-813.

Mathematical analysis covering cubic crystals, with positive or negative magnetocrystalline anisotropy coefficients, and crystals with a single easy direction of magnetization. Estimates are made of the energies and widths of domain boundaries in nickel. Effect of magneto-elastic anisotropy energy. Theoretical values of the energies and widths of the more important types of boundary in Ni, Fe, and Co. 10 ref. (P16, Fe, Ni, Co, SG-p)

270-P. Analytical Method for Determining Magnetic Resistance and Loss in Steel. (In Russian.) B. K. Bul. *Elektrichestvo* (Electricity), May 1950, p. 10-16.

A method of setting up the equation for calculation of active, reactive, and over-all magnetic resistance. Equations are applicable for inductances from 100-200 to 15000 henrys with accuracy of 3-6%. Equation is derived for calculation of angle of loss in steel through induction. Validity of equations is confirmed by experimental data. Equations are interpreted for different value of variables. 15 ref. (P16, ST)

271-P. Electrical and Magnetic Properties of Nickel and Its Alloys. (In Spanish.) R. Dume. *Metalurgia*

y Electricidad, v. 14, Apr. 1950, p. 56-57.

A short review, covering pure Ni, Ni-Mn, Ni-Cu, Ni-Cu-Zn, Ni-Cr alloys, and ferronickels. (P15, P16, Ni)

272-P. Metallurgy Behind the Decimal Point. Earle E. Schumacher. *Journal of Metals,* v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 1097-1110.

Institute of Metals Division Lecture emphasizes the importance of alloying additions or impurities in metals in amounts less than 1.0%—often mere traces. Effects on mechanical, magnetic, and electrical properties. Pb and Pb alloys illustrate strength properties; irons and permanent-magnet alloys illustrate magnetic properties; and Si and Ge alloys illustrate electrical properties. Graphs, diagrams, and photomicrographs.
(P15, P16, Q23, Pb, Si, Ge, SG-n, p)

273-P. The Vapor Pressure of Silver. H. M. Schadel, Jr., and C. E. Birchenall. *Journal of Metals,* v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 1134-1138.

Vapor pressure was measured by the Knudsen orifice-effusion method at 750-1050° C. using radioactive Ag^{110} as a tracer. 14 ref. (P12, Ag)

274-P. The Supercooling of Aggregates of Small Metal Particles. David Turnbull. *Journal of Metals,* v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 1144-1148.

Aggregates of small droplets of Hg, Bi, Ga, and Pb were supercooled to a much greater extent than possible for large continuous masses of the same metals. These results are interpreted theoretically. Procedure is described.
(P12, Hg, Bi, Ga, Pb)

275-P. Equilibrium in the Reaction of Carbon Dioxide With Liquid Copper From 1090 to 1300° C. D. J. Girardi and C. A. Siebert. *Journal of Metals,* v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 1168-1170.

Equilibrium constant for the above reaction. 11 ref. (P12, Cu)

276-P. Ferromagnetic Domains. H. J. Williams. *Electrical Engineering,* v. 69, Sept. 1950, p. 817-822.

Characteristics and theory. Diagrams and powder patterns show structure of the domains and effects of various factors such as polishing technique, increasing and decreasing tension, direction of applied field, etc. 14 ref. (P16, SG-n, p)

277-P. The Resistivity and Hall Effect of Germanium at Low Temperatures. C. S. Hung and J. R. Gliessman. *Physical Review,* ser. 2, v. 79, Aug. 15, 1950, p. 726-727.

Data from room temperature to 2° K. (P15, Ge)

278-P. The Ionization of Hydrogen in Metals. Irvin Isenberg. *Physical Review,* ser. 2, v. 79, Aug. 15, 1950, p. 736-737.

Theory of ionization of hydrogen. It is concluded that hydrogen should ionize in all metals. (P15)

279-P. Superconductivity of Vanadium. Aaron Wexler and W. S. Corak. *Physical Review,* ser. 2, v. 79, Aug. 15, 1950, p. 737-738.

A study to help clarify the nature of the properties of hard superconductors. (P15, V)

280-P. Superconductivity in Tin-Germanium "Alloys". Ralph P. Hudson. *Physical Review,* ser. 2, v. 79, Sept. 1, 1950, p. 883.

A magnetic method was used to determine super-conducting transition curves for two alloys of Ge containing 2.3 and 9.3 atomic % Sn, respectively. (P15, Ge)

281-P. Atomic Moments of Ferromagnetic Alloys. R. M. Bozorth. *Physical Review,* ser. 2, v. 79, Sept. 1, 1950, p. 887.

Shows that the relation between atomic moment and atomic number is not nearly so simple as published curves indicate, if additional available data are used, especially those relating to the alloys of Co and Ni with Mn, Cr, and V. Available data for the binary solid solutions of the elements V to Cu are plotted.
(P10, SG-n, p)

282-P. Domain Structure of a Cobalt-Nickel Crystal. R. M. Bozorth and J. G. Walker. *Physical Review,* ser. 2, v. 79, Sept. 1, 1950, p. 888.

Results of a study for a crystal containing 60% Co.
(P16, Co, Ni)

283-P. Temperature Dependence of the Energy Gap in Germanium From Conductivity and Hall Data. V. A. Johnson and H. Y. Fan. *Physical Review,* ser. 2, v. 79, Sept. 1, 1950, p. 899.
(P15, Ge)

284-P. Rule of Temperature Dependence of Metal Solubility in Iron. (In Russian.) I. I. Kornilov. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, June 21, 1950, p. 1067-1070.

On the basis of theoretical considerations, verified by experimental data, the following rule was formulated: "Change of solubility of elements in the solid phase in a given solvent with temperature is determined by the relative change of the difference in atomic diameters of the elements with temperature". Using this rule, the temperature dependence may be established, not only for iron, but for other metals.
(P13, Fe)

285-P. Use of Steel as an Electrical Conductor in Distribution Equipment for the Peat Industry. (In Russian.) B. I. Rozenberg. *Torfyanaya Promyshlennost* (Peat Industry), v. 27, June 1950, p. 15-17.

Applicability of carbon steel bus bars in electrical equipment. Effect of magnetic permeability, depending on field voltage, as well as specific resistance, chemical composition, and thermal and mechanical treatment of steel on its usefulness for electrical connections. (P15, T1, CN)

286-P. Resistivity of Pure Metals at Low Temperatures. II. The Alkaline Earth Metals. D. K. C. MacDonald and K. Mendelssohn. *Proceedings of the Royal Society,* ser. A, v. 202, Aug. 22, 1950, p. 523-533.

Electrical resistivity of Be, Mg, Ca, Sr, and Ba was investigated in detail in the temperature region below 20° K. In most cases the resistance was also determined in the range up to liquid-air temperatures in order to obtain estimates of Debye characteristic temperatures, which are compared with data obtained by other methods. 17 ref. (P15, Mg, Be, EG-f)

Q

MECHANICAL PROPERTIES AND TEST METHODS; DEFORMATION

608-Q Temper Brittleness in Alloy Steels *Industrial Heating,* v. 17, Aug. 1950, p. 1346. Condensed from "Influence of Composition on Temper Brittleness in Alloy Steels", A. P. Taber, J. F. Thorlin, and J. F. Wallace.

Previously abstracted from *American Society for Metals,* Preprint 22, 1949. See item 3B-201, 1949.
(Q23, J26, AY)

609-Q The Theory of the Discontinuous Yield Point. B. A. Bilby. *Sheet Metal Industries,* v. 27. Aug. 1950, p. 707-718.

Explains the above on the basis of the dislocation theory of plasticity, and its application to yield-point theory and associated phenomena in iron. 48 ref. (Q23, Fe)

610-Q. On the Inhomogeneous Deformation of a Plastic Lamina in a Compression Test. R. Hill. *Philosophical Magazine,* ser. 7, v. 41, Aug. 1950, p. 733-744.

A theory is formulated for calculation of stresses and displacements in thin sheets of arbitrary shape plastically compressed between parallel plates. Experimental data in support of the theory are provided by compression tests on long rectangular strips with both fluid and solid lubricants. A new method is suggested for estimating coefficients of friction applicable to cold working processes. (Q28)

611-Q. A Theoretical Investigation of the Effect of Specimen Size in the Measurement of Hardness. R. Hill. *Philosophical Magazine,* ser. 7, v. 41, Aug. 1950, p. 745-753.

The theory of Hencky and Geiringer for plane plastic strain was applied to calculating minimum dimensions of a specimen for a valid hardness test. Critical widths and thicknesses were determined for rectangular specimens indented by flat dies and wedges of any angle. The manner in which the specimen deforms during indentation. (Q29)

612-Q. The Effect of Cold-Work on Steel. Section III. An X-Ray Investigation of Internal Strains in Cold-Drawn Steels. J. H. Andrew and P. E. Brooks. **Section IV. Effect of High-Speed Deformation on Steel.** J. H. Andrew and L. Bourne. **Section V. An X-Ray Investigation of Structural Changes in Steel Due to Cold-Working.** D. V. Wilson. **Section VI. Effect of Cold-Work on Hydrogen in Steel.** J. H. Andrew, U. V. Bhat, and H. K. Lloyd. **Section VII. General Discussion.** *Journal of the Iron and Steel Institute,* v. 165, Aug. 1950, p. 369-395.

Includes tables, graphs, micrographs, and diffraction patterns. 44 ref. (Q24, Q25, ST)

613-Q. Electrical Resistance Strain Gauges. R. H. Warring. *Machinery Lloyd* (Overseas Edition), v. 22, Aug. 5, 1950, p. 75-77, 79.

A general discussion. Sensitivity, design, types of application, limitations, preparation of test surface, and technique of using. (Q25)

614-Q. The Yield Point of Mild Steel at Non-Homogeneous and Compound Stress Distributions. (In English.) F. K. G. Odqvist and C. Schaub. *Transactions of the Royal Institute of Technology,* No. 34, 1950, 16 pages.

New theory for the above, the flow limit being associated with the spreading of flow layers through part of the test piece. The theory involves a material constant, which may be determined either from macroscopic measurements or from X-ray measurements of stress distribution preceding spreading of flow layers. 13 ref. (Q23, CN)

615-Q. Influence of Copper, Sulfur, and Oxygen on the Red Brittleness of Steels. (In French.) K. Takadera, N. Matsuura, and T. Kirino. *Centre de Documentation Sidérurgique, Circu-*

laire d'Informations Techniques, v. 7, Jan.-Feb. 1950, p. 32-38. Translated and condensed from *Tetsu to Hagare*, v. 29, Feb. 1943, p. 176-182.

Investigated for 0.1-0.2% C. It was found that the red brittleness is caused mostly by oxidation at high temperature. The brittleness varies with carbon content and is influenced to some extent by Cu and S contents. Methods of avoiding this type of brittleness. (Q23, CN)

616-Q. Experimental Research on the Aging of the Material in Metal Bridges. (In Italian.) Angelo Berio. *Metallurgia Italiana*, v. 42, May 1950, p. 175-178.

Results of some static and dynamic control tests on bars taken on some old Italian iron bridges. (Q23, T26, CN)

617-Q. Navy Develops a Wear Testing Machine. George W. Grupp. *Metal Finishing*, v. 48, July 1950, p. 66-67.

Accelerated wear-test machine capable of testing simultaneously 24 different samples of Cr plating. (Q9)

618-Q. Engineering Steels Under Combined Cyclic and Static Stresses. H. J. Gough. *Journal of the American Society of Naval Engineers*, v. 62, Aug. 1950, p. 646-682.

Previously abstracted from *Engineer*. See item 3 B-270, 1949. (Q7, Q1, Q5, ST, CI)

619-Q. Transition Temperature of Ship Plate in Notch-Tensile Tests. E. M. MacCutcheon. *Journal of the American Society of Naval Engineers*, v. 62, Aug. 1950, p. 699-713.

Previously abstracted from *Welding Journal*. See item 250-Q, 1950. (Q23, T22, CN)

620-Q. New Thread Form Reduces Bolt Breakage. Andrew Schwartz, Jr. *Steel*, v. 127, Sept. 4, 1950, p. 86-87, 94.

Endurance limit of bolts, studs, and other threaded fasteners is remarkably increased by a new fatigue resistant thread system designed to minimize "notch effect". The system is diagrammed and fatigue-test data are charted. (Q7, T7)

621-Q. Young's Modulus and Its Temperature Dependence in 36 to 52 Pct Nickel-Iron Alloys. M. E. Fine and W. C. Ellis. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1120-1125.

Experimental apparatus and procedure. Theory and results. 14 ref. (Q21, Ni, Fe)

622-Q. A Study of Strain Markings in Aluminum. Bani R. Banerjee. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1126-1128.

Metallographic evidence of strain markings in 99.998% Al, and a study of their crystallography. Incidental observations provide indirect evidence of a close relationship between strain markings and annealing twins, clarify the peculiar behavior of aluminum in its reluctance to form banded annealing twins, and indicate that the type of localized strain at slip interfaces is responsible for etching effects that render strain markings visible. 11 ref. (Q24, M27, Al)

623-Q. Quantitative Stress-Strain Studies on Zinc Single Crystals in Tension. D. C. Jillson. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1129-1133.

Highly consistent data were obtained, under one particular set of conditions. Effects of many variables remain to be investigated. An effort to confirm the hypothesis of slip by alternating 210 unit movements was unsuccessful. 19 ref. (Q27, Zn)

624-Q. The Ductility of Cast Molybdenum. R. B. Fiscner and J. H. Jackson. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1149-1153.

Bends tests showed the ductility to be a highly directional property. Heat treatment at 2100° F. improved ductility. Cast texture, cleavage planes, and microstructure. (Q5, M27, J23, Mo)

625-Q. The Textures of Cold-Rolled and Annealed Titanium. Howard T. Clark, Jr. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1154-1156.

Pole figures showing textures of high-purity Ti. These textures are significantly different from those of other hexagonal close-packed metals in two respects. (Q24, M23, Ti)

626-Q. A Study of the Plastic Behavior of High-Purity Aluminum Single Crystals at Various Temperatures. F. D. Rosi and C. H. Mathewson. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1159-1167.

Investigated from 77-353° K. Both the critical resolved shear stress and coefficient of shear hardening were found to increase with decrease in temperature. Density of slip bands was also found to increase with decreasing temperature. Some observations were made on appearance of slip bands on etched and unetched electropolished surfaces. 27 ref. (Q2, Q24, Al)

627-Q. The Effect of Sodium Contamination on Magnesium-Lithium Base Alloys. P. D. Frost, J. H. Jackson, A. C. Loonam, and C. H. Lorig. *Journal of Metals*, v. 188, Sept. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 188, 1950, p. 1171-1172.

Effects on tensile ductility and the precautions necessary to avoid the contamination. (Q23, E10, Mg)

628-Q. Vibration Fatigue Testing of TV Antennas. Ken Lippert. *Tele-Vision Engineering*, v. 1, Aug. 1950, p. 11, 31.

Mechanical test procedures and equipment. (Q7)

629-Q. Fatigue Strength of Various Types of Butt Welds Connecting Steel Plates. Wilbur M. Wilson, William H. Munse, and I. Sterling Snyder. *Engineering Experiment Station, University of Illinois*. Bulletin Series No. 384. Mar. 1950. 60 pages. (*Bulletin*, v. 47, no. 50.)

Tests on partial-penetration, transverse single-v, and longitudinal single-v butt welds connecting A7 carbon-steel plates. (Q7, K9, CN)

630-Q. Dependence of the Elastic Strain Coefficient of Copper on the Pre-Treatment. W. Kuntze. *National Advisory Committee for Aeronautics*, Technical Memorandum 1287, Aug. 1950, 18 pages.

Variables were pre-straining by stretching in a tensile-testing machine, drawing through a die, aging at room and elevated temperatures, and annealing. Variation of the elastic strain coefficient with test stress. (Q21, Cu)

631-Q. Static and Impact Strengths of Riveted and Spot-Welded Beams of Alclad 14S-T6, Alclad 75S-T6, and Various Tempers of Alclad 24S Aluminum Alloy. H. E. Grieshaber. *National Advisory Committee for Aeronautics*, Technical Note 2157, Aug. 1950, 44 pages.

Test procedure and data. (Q27, Q6, Al)

632-Q. Investigation of Properties of AISI Type 310B Alloy Sheet at High Temperatures. E. E. Reynolds, J. W. Freeman, and A. E. White. *National Advisory Committee for Aeronautics*, Technical Note 2162, Aug. 1950, 37 pages.

Tensile and rupture tests were made to determine whether service at 1700 to 1800° F. would cause further loss of ductility resulting in brittleness at 1300 to 1400° F. Three heats were used to evaluate heat-to-heat reproducibility and relative effects of annealing, cold working, and hot rolling initial treatments. (Q27, Q4, SS, SG-h)

633-Q. Some Experimental Techniques in Stress Analysis. W. M. Murray. *Year Book of the American Iron and Steel Institute*, 1950, p. 383-395; discussion, p. 396.

Use of photoelasticity, stresscoat technique, and the wire resistance strain gage (SR-4 type). Includes diagrams and photo-elastic patterns. (Q25)

634-Q. The Dependence of the British Standards Reversed Bend Test for Wire on the Testing Machine. J. G. Walford and J. G. Wistreich. *Wire Industry*, v. 17, Aug. 1950, p. 663-665, 667-668, 671.

The two most important types of machines for performing the reversed bend test, frequently specified for testing of wire, were examined. It was found that both the design and the workmanship of the machines have a pronounced effect on the number of bends to fracture. (Q5)

635-Q. Metallurgical Examination of Lead and Lead-Alloy Pressure-Cable Sheaths. A. Latin. *Engineering*, v. 170, Aug. 11, 1950, p. 121-124.

Special mechanical test and metallographic procedures used by a British firm for study of the cause of failures in cable sheaths, which are subjected to internal pressures of about 200 psi. of N_2. Data for pure lead and several of its alloys. Macrographs show typical failures. (Q general, M28, S21, Pb)

636-Q. Damping Capacity. Part III. Effect of the Specimen. Part IV. Correlations and Conclusions. Edward Linacre. *Iron and Steel*, v. 23, Aug. 1950, p. 344-348.

Part III: Effects of composition and grain size, heat treatment, cold work, imperfections, and ferromagnetism. Part IV: Plasticity, strength, and elasticity; general conclusions. 53 ref. (Q8)

637-Q. Cast Iron at Sub-Atmospheric Temperatures. G. N. J. Gilbert. *Foundry Trade Journal*, v. 89, Aug. 10, 1950, p. 149-161; Aug. 17, 1950, p. 179-189; discussion, p. 189.

Previously abstracted from *Institute of British Foundrymen*, Paper No. 964, 1950. See item 565-Q, 1950. (Q23, N8, CI)

638-Q. The Theoretical Background and Interpretation of the Schnadt Impact-Test. (In English.) J. H. Palm. *Metalen*, v. 4, May 1950, p. 177-184; June 1950, p. 213-217; July 1950, p. 231-236.

Because of the growing interest in the above test on the part, not only of design engineers, but of those interested in the cold brittleness problem, a special meeting entirely devoted to the test and its practical significance was held in Holland on Feb. 21, 1950. Part I attempts to give a clear picture of Schnadt's ideas. Part II describes the system and test method themselves. Part III consists of a critical evaluation of the system. 17 ref. (Q6)

639-Q. Microsclerometric Analysis of the Temper Brittleness of Steel With Low Nickel and Chromium Con-

tents. (In French.) Helmut Bückle and Pierre-A. Jacquet. *Comptes Rendus* (France), v. 230, June 19, 1950, p. 2198-2200.

Studied for low-alloy steel (0.30% C, 3.25% Ni, 1.65% Cr) using the microhardness tester of Hanemann and Zeiss. It was found that the Meyer exponent is less than 2 for this steel when it is tough and greater than 2 when brittle. Indicates that temper brittleness results from reversible transformation of carbides which induces a state of stress. (Q23, Q29, N8, AY)

640-Q. Comparative Tests on Steel and Light-Alloy Beams Supporting Hatch Covers. (In French.) *Revue de l'Aluminium*, v. 27, June 1950, p. 226-227.

Results of comparative tests by British engineers showing that the Al alloy (A-SG) beam weighs 56% less but resists 30% more load without permanent deformation. (Q28, T26, Al)

641-Q. Basis of the Mathematical Theory of Plasticity and Its Investigation. (In German.) Fritz Stussi. *Zeitschrift für angewandte Mathematik und Physik*, v. 1, no. 4, 1950, p. 254-267.

Mathematical theory and results of experimental work on thin-walled hollow cylinders, designed to determine the correctness of the current theory of plasticity. It was found that the coefficient of lateral expansion for the plastic deformation components is not two; therefore the hypothesis of constant volume during plastic deformation is incompatible with the behavior of the material examined. Also the behavior of the material was not isotropic or quasi-isotropic, but decidedly anisotropic. Thus, the second hypothesis of the theory of plasticity is also not borne out by the facts. (Q23)

642-Q. Laws of the Creep of Metals. (In Russian.) V. I. Likhtman. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, June 21, 1950, p. 1079-1082.

Creep was theoretically investigated at room, high, and low temperatures under different applied loads. Formulas are proposed which describe the constancy of internal cohesion of metal during creep. An equation for determination of the minimum rate of creep is derived and interpreted for different values of the variables. (Q3)

643-Q. The Fatigue Limit of Chrome Plated Aircraft Steels. *Metal Finishing*, v. 47, Nov. 1949, p. 60-61, 98. Condensed from "Effect of Chromium Plating on the Endurance Limit of Steels Used in Aircraft," Hugh L. Logan.

Previously abstracted from *Journal of Research of the National Bureau of Standards.* See item 3B-219. (Q9, Cr, AY)

644-Q. Mathematical Analysis of Springback Angles for Aluminum Sheets. Y. C. Lee. *Tool Engineer*, v. 25, Sept. 1950, p. 21-23.

Analysis is based on experimental results for clad 24S-T and 24S-O. Springback is tabulated and charted vs. radius of the steel-block form used, vs. thickness, and for various pressures on the form block. (Q21, Al)

645-Q. Why and How Metals Break. *Welding Journal*, v. 29, Sept. 1950, p. 768-769. Reprinted from *Welding Arcs*, June 1949.

New theories. Investigations show that fracture of metals begins with extremely small cracks, nuclei which grow into a large split when enough tension is applied. (Q26)

646-Q. The Influence of Biaxiality on Notch Brittleness. D. Rosenthal and W. D. Mitchell. *Welding Journal*, v. 29, Sept. 1950, p. 409s-421s.

Notch sensitivity of mild steel flat specimens subjected to tension and bending was investigated by means of the ductility transition temperature. Effects of thickness of specimens, and depth and radius of the notch. The last two quantities were varied in such a way as to keep constant the stress-concentration factor at the bottom of the notch. 17 ref. (Q23, CN)

647-Q. Interpretive Report, Fabrication Division, Pressure Vessel Research Committee. H. C. Boardman. *Welding Journal*, v. 29, Sept. 1950, p. 422s-432s.

Engineering report on contemporary scientific research in the fabrication of pressure vessels and closely allied fields. Deals mainly with work at Lehigh University covering choice of transition-temperature test specimen, effect of plastic strain and heat treatment, and effect of plastic strain, followed by welding and subsequent heat treatment, on transition temperature. (Q23, K general, T26, ST)

648-Q. Comparative Tests of Different Types of Notch Impact Specimens. *Welding Journal*, v. 29, Sept. 1950, p. 466s. Translated and condensed from *Lastechniek*, v. 16, May 1950, p. 79-81.

Transition temperature of a killed basic openhearth steel was measured with three types of specimen, each 0.394 in. square, 2 3/16 in. long. Type 1 had a notch 0.20 in. deep, 0.04 in. radius, and is the specimen recommended by the International Standards Assn. Type 2 had a notch 0.12 in. deep, 0.04 in. radius and is the standard German DVMR type. In Type 3, notch depth was 0.08 in., and notch radius 0.04 in. This is the Mesnager specimen used in Belgium. For types 1 and 2 the transition temperature lay between −20 and −40° C. The Mesnager specimen, on the other hand, indicated a transition temperature below −60° C. (Q6, ST)

649-Q. The Micro-Mechanism of Fracture in the Tension-Impact Test. W. H. Bruckner. *Welding Journal*, v. 29, Sept. 1950, p. 467s-476s.

Results of metallographic studies made on a number of specimens of rimmed, semi-killed, and fully killed steels, and on an Armco iron. The samples were partially fractured, or loaded just to fracture, then sectioned and examined. (Q27, ST, Fe)

650-Q. Room Temperature Tensile Tests as an Index of Transition Temperature of Steel Plates. Sadun S. Tör, Robert D. Stout, and Bruce G. Johnston. *Welding Journal*, v. 29, Sept. 1950, p. 477s-483s.

Possibility of using reduction-of-area results obtained from room-temperature, round-bar tensile tests to predict transition temperatures of pressure-vessel steels. Extensive experimental data support this suggestion. (Q27, ST)

651-Q. Distribution of Locked-In Stresses in a Large Welded-Steel Box Girder. John Vasta. *Welding Journal*, v. 29, Sept. 1950, p. 484s-493s.

A large welded box girder, made of relatively thick plates and embodying a high degree of constraint, was fabricated and then trepanned for the purpose of determining stress distribution. Stresses were obtained by the relaxation method, and changes in strain were measured by means of SR-4 gages. Strain-gage drift and other factors affect probable accuracy of the data. The limitations of a quasi-destructive method as a tool for determining locked-in stresses. (Q25, CN)

652-Q. Impact Tests of Welded Austenitic Stainless Steels. V. N. Krivobok and R. D. Thomas, Jr. *Welding Journal*, v. 29, Sept. 1950, p. 493s-495s.

Data were obtained through the combined efforts of the research laboratories of International Nickel Co. and Arcos Corp. AISI types 301, 302, 304, 308, 310, 316, 317, 318, and 347 were tested at room temperature, −105, and −320° F. (Q6, SS)

653-Q. Stress Analysis With Brittle Lacquer. B. Salmon. *Aircraft Engineering*, v. 22, Sept. 1950, 256-263. Translated from *Technique et Science Aeronautiques*, No. 6, 1949, p. 343-362.

A method for experimental evaluation of loads developed in components of complex shape. (Q25)

654-Q. The Flow and Fracture of a Brittle Material. L. F. Coffin, Jr. *Journal of Applied Mechanics*, v. 17 *(Transactions of the American Society of Mechanical Engineers*, v. 72), Sept. 1950, p. 233-248.

Mathematical analysis of the mechanism of flow and fracture of gray cast iron is followed by a description of a combined stress-testing program in which thin-walled cast-iron tubes were subjected to two-dimensional states of combined stress covering the complete two-dimensional field. Stress-strain curves and permanent volume change on tension and compression, also plastic volume change, are charted. 19 ref. (Q23, Q26, CI)

655-Q. Approximate Solutions of Problems of Plane Plastic Flow. P. G. Hodge, Jr. *Journal of Applied Mechanics*, v. 17 *(Transactions of the American Society of Mechanical Engineers*, v. 72), Sept. 1950, p. 257-264.

A method of approximating stress and velocity fields in these problems. A general procedure for finding the deformed pattern of an originally square grid is devised and applied to two examples. Results are compared with known continuous solutions and with experiments. 10 ref. (Q23)

656-Q. Crushing of Aluminum Tubes Under Hydrostatic and Localized Pressure. E. Creutz. *Journal of Applied Mechanics*, v. 17 *(Transactions of the American Society of Mechanical Engineers*, v. 72), Sept. 1950, p. 324-326.

Equations derived by Sturm and Timoshenko have been found to fit experimental data on steel tubes, provided the length is several times the diameter, and the ratio of diameter to wall thickness exceeds about 30. An experimental study of Al tubes was conducted to determine whether the equations would apply. No satisfactory correlation was found to exist, but a simple equation was derived which is well within the reproducibility of the test results. (Q28, Al)

657-Q. Creep of Annealed High-Purity Copper. *Technical News Bulletin* (National Bureau of Standards), v. 34, Sept. 1950, p. 130-131. Based on paper by W. D. Jenkins and T. G. Digges, *Journal of Research of the National Bureau of Standards*, v. 45, Aug. 1950.

Effects on creep behavior of stress, temperature, mechanical and thermal history, rate of loading, and sudden changes in both stress and temperature. Tests were made at 110, 250, and 300° F. Metallographic examination, hardness measurements, and tension tests were conducted at room temperature. (Q3, Cu)

658-Q. Adhesion of Indium Under Static and Dynamic Loading. A. W. Crook and W. Hirst. *Research*, v. 3, Sept. 1950, p. 432-433.

Mechanical behavior of indium during impact was studied by meas-

uring piezoelectrically the force of impact as a function of time. (Q6, In)

659-Q. Creep Deformation of Metals. L. Rotherham and L. W. Larke. *Research*, v. 3, Sept. 1950, p. 434-436.

Some observations of grain growth in a 0.5% Ag aluminum alloy in which the effect on creep rate was not very large. Observations suggest that the breakdown to subgrains is not the primary cause of creep, but a secondary effect resulting from creep. (Q3, Al)

660-Q. Friction. F. P. Bowden. *Nature*, v. 166, Aug. 26, 1950, p. 330-334.

Fundamental principles in general. Area of contact between solids; friction and adhesion; general effect of surface films; surface temperature of sliding solids; and frictional properties of plastics. (Q9)

661-Q. The Meyer Law for Hardness Tests. Emilio Jimeno and Jose Terraza. *Nature*, v. 166, Aug. 26, 1950, p. 359.

Mathematical analysis. Table shows that calculated values are consistent with experimental ones for Cu, 70-30 brass, commercial Al, and soft steel. (Q29, Al, Cu, CN)

662-Q. Creep Due to Fluctuating Stresses at Elevated Temperatures. H. J. Tapsell, P. G. Forrest, and G. R. Tremain. *Engineering*, v. 170, Aug. 25, 1950, p. 189-191. (A condensation.)

Results of experimental study for the heat resisting materials Rex 78 and Nimonic 80, and for the Al alloy RR59, also for 0.26% C steel. Experimental and theoretical data are compared. (Q3, Al, CN, Ni, SG-h)

663-Q. The Electrical Wire Resistance Strain Gauge and Its Applications. F. C. Widdis. *Machinery* (London), v. 77, Aug. 31, 1950, p. 259-264. (Q25)

664-Q. The Flow of Zinc Under Constant Stress. A. H. Cottrell and V. Aytekin. *Journal of the Institute of Metals*, v. 77, July 1950, p. 389-422.

Part A: A general study of flow of single crystals of pure Zn, under constant shear stress on the glide planes, and of polycrystalline specimens, under constant tensile stress. Part B: Nature of steady-state flow in single crystals is examined from the point of view of the recovery theory of creep. Application of the theory to the softening of strain-hardened crystals during annealing experiments leads to the conclusion that yield strength should decrease according to a logarithmic time relation. 33 ref. (Q24, Q3, Zn)

665-Q. Mechanism of Primary Creep in Metals. W. A. Wood and R. F. Scrutton. *Journal of the Institute of Metals*, v. 77, July 1950, p. 423-434.

Studied experimentally, using 99.98% Al. Micrographs and X-ray diffraction patterns illustrate results obtained, which are analyzed theoretically. (Q3, Q24, Al)

666-Q. The Mechanism of Creep as Revealed by X-Ray Methods. G. B. Greenough and Edna M. Smith. *Journal of the Institute of Metals*, v. 77, July 1950, p. 435-443.

A hypothesis is proposed to explain in terms of dislocation theory the recent observations of Wilms and Wood and of Wood and Rachinger in relation to the mechanism of deformation of metals. Some new X-ray observations on Al which support the hypothesis. (Q3, Q24, Al)

667-Q. Some X-Ray Observations on the Nature of Creep Deformation in Polycrystalline Aluminium. E. A. Calnan and B. D. Burns. *Journal of the Institute of Metals*, v. 77, July 1950, p. 445-455.

Back-reflection Laue patterns were taken from the same series of locations on a large-grained Al testpiece after successive amounts of creep deformation at 250° C. From analysis of the asterism and movement of the reflection spots relative to the stress axis, it appears that creep deformation up to about 3% extension in 170 hr. is associated with slip processes. Later stages are characterized by presence of numerous fine units or cells formed from the previously distorted material. 12 ref. (Q3, Q24, Al)

668-Q. Mechanical Properties of Materials. C. W. MacGregor. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 1-27.

Properties which are of interest to the stress analyst. Defines basic concepts. Stress-strain diagrams and their advantages. 31 ref. (Q general, Q25)

669-Q. Testing Machines. Joseph Marin. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 28-71.

Methods of load application and load measurement. Static, dynamic, and special testing machines. 64 ref. (Q general)

670-Q. Mechanical Gages and Extensometers. L. H. Donnell and W. T. Savage. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 72-117.

Problems arising in the design of mechanical instruments and mechanical parts of optical and electric instruments used to measure strains and small motions. 25 ref. (Q25)

671-Q. Optical Methods of Strain Measurement. John L. Maulbetsch. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 118-159.

Definitions and elements of optical theory necessary for understanding functioning of optical systems. Elements of instruments from the specifications view. Instruments and systems. 41 ref. (Q25)

672-Q. Electrical-Resistance Gages and Circuit Theory. C. O. Dohrenwend and W. R. Mehaffey. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 160-237.

Types of gages, electric circuits used with them, principles of electronics, and their application to the gaging problem. Includes circuit diagrams and graphs. 26 ref. (Q25)

673-Q. Electric-Inductance Gages. B. F. Langer. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 238-272.

General types, fundamental relationships, types of pickup, structural details, magnetic forces, typical circuits, theory of the a.c. bridge, auxiliary equipment, applications, and limitations. 20 ref. (Q25)

674-Q. Electric-Capacitance Gages. B. C. Carter, J. R. Forshaw, and J. F. Shannon. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 273-300.

Varying gap and varying area pickups, amplifier circuits for variable capacitance gages, and applications to strain measurement. Developments made by the authors and other work on capacitance measurement. 10 ref. (Q25)

675-Q. Motion Measurements. J. Ormondroyd, R. B. Allnutt, F. Mintz, and R. D. Specht. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 301-389.

Steady-state and transient motion; stresses due to each, measuring instruments, and interpretation of data. 61 ref. (Q25)

676-Q. Strain Rosettes. J. H. Meier. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 390-437.

Definition of strain rosettes and their purpose. Stresses and strains at a point, measurements, sensitivity of gages, computations, observation errors, and graphical representation. 65 ref. (Q25)

677-Q. Working Stresses. C. Richard Soderberg. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 438-458.

The phenomenon of failure; strength properties of materials; yielding of ductile metals; fractures; working stress; and proposed rules for working stresses. 13 ref. (Q23, Q26)

678-Q. Residual Stresses. Oscar J. Horger. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 459-578.

Use of thermal and transformation stresses to improve fatigue resistance. Methods of measurement. Relation to machining operations, parts (tubes, gears, rivets, beams, etc.), heat treatment, cracking, and flaking. Involves carbon and alloy steels and aluminum. 198 ref. (Q25, Al, AY, CN)

679-Q. Interpretation of Service Fractures. R. E. Peterson. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 593-635.

Bending-fatigue, torsion-fatigue, static or constant-load, and impact fractures. Special cases of fatigue failure. 77 ref. (Q7, S21)

680—Q. Brittle Models and Brittle Coatings. M. Hetenyi. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 636-662.

Characteristics of brittle fractures; plaster models; statistical theory of strength and stress crazing of synthetic resins. Covers oxide and resinous coatings and stress-coat. 57 ref. (Q25)

681-Q. Structural Model Analysis. J. B. Wilbur and C. H. Norris. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 663-699.

Application and standard methods for stress analysis. Design of models and properties of model materials. 16 ref. (Q25)

682-Q. Analogies. Raymond D. Mindlin and Mario G. Salvadori. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 700-827.

A mathematical treatment including sections on torsion and flexure of cylindrical bars; electrical analogies for the torsion of bars of varying circular section; two-dimensional stress and strain; electric-network analogue of the elastic field; and electric-network analogues of framed structures. 67 ref. (Q general, Q25)

683-Q. Photoelasticity. I. Fundamentals and Two-Dimensional Applications. T. J. Dolan and W. M. Murray. **II. Three-Dimensional Photoelasticity.** D. C. Drucker. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 828-976.

Equipment and procedure applied to stress analysis. 177 ref. (Q25)

684-Q. X-Ray Analysis. Charles S. Barrett. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 977-1012.

Detection of internal flaws by radiography and determination of stresses by X-ray diffraction. 67 ref. (Q25, S13, M22)

685-Q. Fundamentals of the Theory of Elasticity. S. P. Timoshenko. "Handbook of Experimental Stress

Analysis", John Wiley & Sons, New York, 1950, p. 1013-1034.

Plane and three-dimensional stress and strain. (Q21)

686-Q. Dimensional Analysis. J. N. Goodier. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 1035-1045.

Methods and applications to elastic, linear, and composite structures. Relaxation of similarity conditions; gravity and surface loads; prescribed displacements; curved stress-strain relations; buckling; and vibration due to aerodynamic forces. (Q25)

687-Q. The Precision of Measurements. M. Hetenyi. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 1046-1060.

A general statistical discussion. (Q25, S12)

688-Q. (Book) **Handbook of Experimental Stress Analysis.** M. Hetenyi, editor. 1077 pages. 1950. John Wiley & Sons, 440 Fourth Ave., New York 16. $15.00.

Eighteen chapters and three appendixes by different authors, covering experimental methods of determining mechanical stress and related topics (residual stresses, interpretation of service fractures, etc.). (Individual papers are separately abstracted.) (Q25)

689-Q. (Book) **The Inelastic Behavior of Engineering Materials and Structures.** Alfred M. Freudenthal. 587 pages. 1950. John Wiley & Sons, 440 Fourth Ave., New York 16. $7.50.

Basic concepts and definitions. Develops physical and engineering framework of the theory of inelasticity (theory of general deformational behavior). Problems of the mechanics of the inelastic continuum, design of engineering structures, and mechanical testing. Chapter bibliographies. (Q general, Q23)

R

CORROSION

322-R. The Oxidation of Several Metals in Activated Oxygen at High Temperatures. Andrew Dravnieks. *Journal of the American Chemical Society,* v. 72, Aug. 1950, p. 3761-3767.

Oxidation of Cu and several other metals in ordinary and in activated O_2 are compared. Only in the case of Cu are reproducible differences caused by the presence of an excess of free oxygen atoms. Monatomic oxygen may accelerate, retard or not influence the rate of oxidation. Conditions for appearance of Cu_2O in the scale and an explanation of some types of complex oxidation curves. 18 ref. (R2, Cu)

323-R. Materials Selection Chart. N. S. Mott. *Chemical Engineering,* v. 57, Aug. 1950, p. 197-200.

Chart lists common industrial chemicals and materials in alphabetical order. Degree of resistance to corrosion by each material of carbon steel; stainless types 304, 316, and FA-20; and a few Ni alloys is indicated qualitatively. (R5, R6, R7, T29, CN, SS, Ni)

324-R. Corrosion of Metals Underground. *Gas Age,* v. 106, Aug. 17, 1950, p. 30-31.

Outlines work of Denison and Romanoff of the National Bureau of Standards. Approximately 3000 specimens of representative pipe materials, exposed to soil corrosion for periods up to 14 years, have been examined, and loss of weight and depth of pitting measured and interpreted. The specimens were buried at 15 test sites widely separated throughout the U. S. (R8)

325-R. Durability of Aluminum and Its Alloys — Atmospheric Exposure. *Light Metals,* v. 13, July 1950, p. 395-402; Aug. 1950, p. 429-438.

Results of tests on weathering and soil attack on various alloys. Protective coatings; behavior in roofing structures. 12 ref. (R3, R8, T26, Al)

326-R. Erosion and Corrosion Accompanying the Use of Heavy Fuel Oils as Engine, Boiler, and Gas Turbine Fuels. (In German.) B. Engel. *Erdöl und Kohle,* v. 3, July 1950, p. 321-327.

Causes and specific suggestions for reducing or preventing such attack. 10 ref. (R7)

327-R. The Fundamentals of Galvanic Corrosion. A. B. Lauderbaugh. *Gas Age,* v. 106, Aug. 31, 1950, p. 20-25, 58, 60.

Previously abstracted from *Oil and Gas Journal.* See item 319-R, 1950. (R1)

328-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 42, Sept. 1950, p. 111A-112A.

Metals and alloys generally used and suitable for handling HCl. (R5)

329-R. Tower Corrosion Arrested With Boiler Blow-Down Water. *Oil and Gas Journal,* v. 49, Aug. 31, 1950, p. 84.

Severe corrosion in shell of vapor stripper of distillation column (pH of 4.5 for the steam condensate present) caused failure in shell and opposite downcomer weirs on top three plates. Boiler blowdown water (pH of 11) was fed in, to bring condensate mixture to neutral point, or slightly alkaline. A small pressure-type filter was constructed to remove sludge and solids. Further corrosion was arrested. (R7, CN)

330-R. Volatile Corrosion Inhibitors; New Rust Preventatives May Revolutionize Ordnance Packaging. Gilbert Foster. *Ordnance,* v. 35, sec. 1, Sept.-Oct. 1950, p. 158-160.

Use of dicyclohexylamine nitrite and related compounds for the above. The materials are placed with the ordnance items, which are then placed in airtight bags. Suitable only for ferrous metals at present. (R10, T2, Fe)

331-R. Effect of Barnacles and Corrosion on Metals and Alloys Suspended in Sea Water. Starr Thayer. *Corrosion* (News Section), v. 6, Sept. 1950, p. 1.

Observations made of several metals and alloys submerged in sea water of Galveston Bay, Texas, for 110 days. (R1, R4)

332-R. Corrosion of Metals in Fluorine and Hydrofluoric Acid. G. C. Whitaker. *Corrosion* (Technical Section), v. 6, Sept. 1950, p. 283-285.

Experience based on the literature and several years' experience. 10 ref. (R5)

333-R. Corrosion Problems in the Railroad Industry. Ray McBrian and L. C. Atchison. *Corrosion* (Technical Section), v. 6, Sept. 1950, p. 286-289; discussion, p. 289.

Some of the specific problems found with various types of motive power, track materials, and passenger and freight cars. Such complex problems as abrasion corrosion, vibration corrosion, wear of diesel locomotive surfaces, and problems specifically related to climatic conditions or refrigerator-car ice-brine drainage. (R general, T23)

334-R. The Influence of Stress on Corrosion. Part II. (Concluded.) Julius J. Harwood. *Corrosion* (Technical Section), v. 6, Sept. 1950, p. 290-307.

Nature of stress-corrosion, test methods, theories, preventive methods, and stress-corrosion in commercial-metal systems. 41 ref. (R1)

335-R. Electrochemical Behavior of Zinc and Steel in Aqueous Media. Part II. R. B. Hoxeng. *Corrosion* (Technical Section), v. 6, Sept. 1950, p. 308-312; discussion, p. 312.

Shows that constituents present in natural waters have a pronounced effect on the electro-chemical behavior of zinc. In laboratory tests it was found that the effect of Cd, even in small amounts, was to shift the potential of Zn in the anodic direction. Silicate additions likewise promote anodic Zn potentials, tending thereby to decrease the possibility of reversals in Zn-steel couples. Additional laboratory data confirm earlier evidence that temperature is secondary to electrolyte composition in its effect. (R1, R4, Zn, ST)

336-R. An Electrochemical Mechanism of Corrosion Inhibition by Chromates, Nitrites and Other Oxidants. Marcel Pourbaix and Pierre Van Rysselberghe. *Corrosion* (Technical Section), v. 6, Sept. 1950, p. 313-315.

A portion of a theoretical and experimental study of inhibitors based upon use of the polarographic method. Classifies corrosion inhibitors as surface conversion inhibitors; adsorption inhibitors; and diffusion inhibitors; with examples of each. A brief analysis of the mechanism of each type. (R10, Fe)

337-R. "AC"—A New Corrosion Test. Thomas E. Lloyd. *Journal of Metals,* v. 188, Sept. 1950, p. 1092-1093.

The alternate condensation method appears to offer a technique more comparable to normal weather corrosion than any yet devised. Unlike other methods, it uses a condensate rather than a dip or a spray to effect corrosive action. Equipment and procedure. (R11)

338-R. Studies on Galvanic Couples. II. Some Potential-Current Relations in Galvanic Corrosion. H. D. Holler. *Journal of the Electrochemical Society,* v. 97, Sept. 1950, p. 277-282.

Develops graphic method for expressing the electrical characteristics of a galvanic couple. A definite current pattern was demonstrated with the iron-magnetite couple. If these relations can be determined in the case of pipe-lines and other underground structures, it may be possible to evaluate the total galvanic current flowing in the phase boundary and, therefore, the rate of corrosion. Then, it may be possible to estimate how much externally applied potential or current is required to stop corrosion. (R1)

339-R. Corrosion Rate and Etch Structures of Aluminum; Effect of Heat Treatment and Impurities. B. Roald and M. A. Streicher. *Journal of the Electrochemical Society,* v. 97, Sept. 1950, p. 283-289.

Effect of heat treatment of Al ranging in purity from 99.2 to 99.998% on rates of dissolution and resulting etch structures in HCl and NaOH. 21 ref. (R2, J general, Al)

340-R. The Rate of Corrosion of Silver in Solutions of Ferric Sulfate. Hugh Salzberg and Cecil V. King. *Journal of the Electrochemical Society,* v. 97, Sept. 1950, p. 290-297.

Corrosion rate as a function of concentration of ions involved, concentration of acid, speed of stirring, temperature, and emf. of the Ag-Ag ion, ferric-ferrous ion cell. A rate equation is derived which includes the effects of adsorption and of the reverse reaction. 15 ref. (R5, Ag)

341-R. Corrosion Resistance and Mechanical Properties of Carbon Austenitic Stainless Steels. D. C. Buck, J. J. Heger, F. J. Phillips, and B. R. Queneau. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 56-80; discussion, p. 81-86, 217-231.

Tests for 18-8, 18-8Cb, 18-8Mo, and 18-8MoCb, and corrosion tests of welded samples. Includes micrographs. (R11, Q general, SS)

342-R. Accelerated Corrosion Testing of Chromium-Nickel Stainless Steel Weldments. F. K. Bloom and M. E. Carruthers. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 87-100; discussion, p. 100-102, 217-231.

Three common tests and a comparison of their results with field experience using a welded pickling tank. The nitric-hydrofluoric acid test appeared to be the most severe criterion of susceptibility to weld decay. 15 ref. (R11, K9, SS)

343-R. An Appraisal of Methods for Evaluating the Corrosion Resistance of Stainless Steels. M. H. Brown, W. B. DeLong, and W. R. Myers. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 103-119; discussion, p. 119-120, 217-231.

Compares three test methods and considers the effect of alloy composition on routine HNO_3 tests on stainless castings. Value of tests compared to service failure. (R11, SS)

344-R. Some Observations on Tests for Intergranular Susceptibility of 18-8 Mo Stainless Steels. H. Ebling and M. A. Scheil. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 121-138; discussion, p. 138-145, 217-231.

A large number of variables exist in present testing practice and a standard practice should be inaugurated. Using a acidified $CuSO_4$ solution, tests were made on Type 316 heats to determine effects of stabilizing heat treatment temperature (1550 and 1650° F.), time, and cooling rate. Other tests were made to study effects of sensitizing at 800 and 900° F. for 500 hr. after stabilizing heat treatment. Comparison tests were made on Type 316-Cb. (R11, R2, SS)

345-R. Influence of Carbon and Molybdenum on the Intergranular Corrosion Resistance of Austenitic Chromium-Nickel Steels With and Without Columbium. W. O. Binder and C. M. Brown. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 146-171; discussion, p. 172-182, 217-231.

Compares intergranular corrosion tests made on five types of 18-8 steel containing 0.06 and 0.03% maximum carbon, including Mo and Mo-Cb variations. The HNO_3 test reveals intergranular attack due to phase formation and to chromium carbide precipitation; however, another test must be used to distinguish between the two causes. (R2, R11, SS)

346-R. Comparative Corrosion Resistance of Stainless Steels in Various Acids. R. B. Mears, C. P. Larrabee, and C. F. Fetner. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950. p. 183-187; discussion, p. 188-191, 217-231.

Results are compared for Types 304 and 316 in both annealed and sensitized conditions exposed to boiling sulfuric, nitric, lactic, phosphoric and acetic acids. (R11, R5, SS)

347-R. Comparison of Plant Corrosion Test Results on Austenitic Stainless Steels With Results of Huey and Strauss Tests. H. O. Teeple. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 192-199; discussion, p. 188-191.

Data were obtained by exposing test specimens using unwelded, as-welded, and welded and heat treated specimens of Types 304, 347, and 316. Results and composition data. (R11, SS)

348-R. Results of Some Plant Corrosion Tests of Welded Stainless Steels. George F. Comstock. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 200-209; discussion, p. 209-210; 217-231.

Corrosion tests were made in chemical plants under regular operating conditions, and results compared with those obtained by the standard boiling HNO_3 procedure. Specimens included Types 304, 321, and 347 sheets, welded with Types 308, 321, and 347 electrodes, respectively, and tested both in as-welded and stress-relieved conditions. Results show no correlation. (R11, SS)

349-R. Testing Multiple Specimens of Stainless Steels in a Modified Boiling Nitric Acid Test Apparatus. William B. DeLong. *American Society for Testing Materials,* "Symposium on Evaluation Tests for Stainless Steels", Special Technical Publication No. 93, 1950, p. 211-214; discussion, p. 215-216, 217-231.

Apparatus, procedure and results. (R11, SS)

350-R. Cavitation in Liquids. E. G. Richardson. *Endeavour,* v. 9, July 1950, p. 149-153.

Summarizes knowledge of cavitation, which plays a part in the design of ships' propellers, in the study of certain types of metallic corrosion, and in the application of some ultrasonic techniques. (R2)

351-R. Durability of Aluminium and Its Alloys — Atmospheric Exposure. *Light Metals,* v. 13, July 1950, p. 395-402; Aug. 1950, p. 429-438.

Results of tests on weathering and soil attack on various alloys. Protective coatings. Behavior in roofing structures. 12 ref. (R3, T26, Al)

352-R. The Nature and Scope of Temporary Corrosion Preventives. D. Clayton and M. C. Thompson. *Journal of the Institute of Petroleum,* v. 36, July 1950, p. 423-428.

Usual types and newer developments. Field of use and principal causes of failure. Some questions concerning accelerated testing are raised. (R10, R11)

353-R. Assessment of the Protective Value of Temporary Corrosion Preventives (With Particular Reference to Humidity Cabinet Tests). T. G. Clinton. *Journal of the Institute of Petroleum,* v. 36, July 1950, p. 428-435.

Use of a humidity cabinet and an intermittent salt-spray test. Accelerated weathering, continuous salt-spray, and natural weathering tests are mentioned. (R11)

354-R. Use of Weatherometer and Humidity Cabinets for Evaluation of Temporary Corrosion Preventives. W. Pohl. *Journal of the Institute of Petroleum,* v. 36, July 1950, p. 436-448. (R11)

355-R. A Method for the Evaluation of Soft-Film Temporary Corrosion Preventives for Ferrous Articles. T. P. Hoar and G. C. Smith. *Journal of the Institute of Petroleum,* v. 36, July 1950, p. 448-457.

A very thin but reproducible film is deposited from a volatile solvent onto a clean steel surface, and the incidence of corrosion due to small drops of distilled water is determined after 24 hr. The technique was used to evaluate the relative protective value of several mineral-jelly compositions with amphipathic substances. Results are discussed in terms of adsorption of a firmly held monolayer of amphipathic substance on the oxide-film. (R11, ST)

356-R. Application of an Accelerated Atmospheric Corrosion Test to the Assessment of Temporary Corrosive Preventives. R. St. J. Preston and E. G. Stroud. *Journal of the Institute of Petroleum,* v. 36, July 1950, p. 457-463.

Test in which specimens are exposed in a thermostatically controlled humid atmosphere containing SO_2, and its use in the evaluation of materials ranging from light lubricating oil, through petroleum jelly, to bitumen for protection of steel panels. (R11, ST)

357-R. Tests of the Protective Value of Temporary Corrosion Preventives on Steel. S. G. Clarke and E. E. Longhurst. *Journal of the Institute of Petroleum,* v. 36, July 1950, p. 463-473.

Results of tests made by relatively simple methods. (R11, ST)

358-R. Investigations Into Tropic Proofing of Electrical Material, 1943-46. V. The Corrosion of Copper Wires at D. C. Potential in Contact With Electrical Insulating Materials. R. J. Meakins. *Australian Journal of Applied Science,* v. 1, Mar. 1950, p. 128-132.

Method of investigation under moist conditions. Results indicate that corrosion of this type depends chiefly on the affinity for water of the insulating materials with which the copper wires are in contact. Severe corrosion was observed in tests with cellulose materials, which are highly polar, whereas non-polar materials did not give corrosion. 11 ref. (R3, T1, Cu)

359-R. Hydrophobic Treatment of Metallic Powders for Their Protection Against Corrosion. (In Russian.) A. I. Levin and A. V. Pomosov. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, June 21, 1950, p. 1075-1078.

Proposes decreasing the tendency of Cu powder to moisture absorption by formation on the surface of the Cu particles of a hydrophobic adsorption layer using surface-active organic compounds of the fatty and aromatic series. Experimental investigation showed the possibility of using such compounds with excellent results. (R10, Cu)

360-R. Anthracene-Oil Bases as Inhibitors for Use in Chemical Removal of Boiler Scale. (In Russian.) N. A. Gruzdeva. *Promyshlennaya Energetika* (Industrial Power), v. 7, June 1950, p. 14-16.

Physical characteristics of and comparative data on anthracene bases vs. other common inhibitors. (R10)

361-R. Corrosion of Some Light Alloys. (In Italian.) P. Brenner. *Alluminio,* v. 19, no. 3, 1950, p. 225-236. Translated from the German.

Previously abstracted from *Metalloberfläche.* See item 98-R, 1950. (R1, R2, Al)

362-R. Stress-Corrosion Cracking of Mild Steel. R. N. Parkins. *Welding Journal,* v. 29, Sept. 1950, p. 458s.

Discusses paper by D. Cubicciotti and William Boyer (Mar. issue; item 112-R). Believes that conclusion of the latter that cold working of the metal acts as a preventative

to stress-corrosion is not justified. Includes authors' reply. (R1, CN)

363-R. The Corrosion of Iron. Manfred Ragg. *Paint, Oil and Chemical Review,* v. 113, Sept. 14, 1950, p. 12, 14, 16, 18.

The immense annual loss by corrosion. The corrosion mechanism, including passivation and chemical surface treatments. (R general, Fe)

364-R. (Book) **Thin Films and Surfaces.** Winifred Lewis. 120 pages. 1950. Chemical Publishing Co., 26 Court St., Brooklyn 2, N. Y. $4.75.

Critical survey of the results of research on thin metallic films and surfaces with special reference to aluminum. What is known about the structure, production, and mechanical, optical, magnetic, electrical, and chemical properties of thin metallic films and surfaces in general. (R2, L general, Al)

365-R. (Book) **Symposium on Evaluation Tests for Stainless Steels.** 231 pages. 1948. American Society for Testing Materials (Special Technical Publication No. 93), 1916 Race St., Philadelphia 3, Pa.

Ten papers discussing significance of laboratory evaluation tests in relation to practical experience under diverse service conditions. Effects on behavior of test alloys and effects of lowering carbon contents to extremely low limits. Papers are abstracted separately. (R11, SS)

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INSPECTION AND CONTROL

339-S. Cobalt 60 for Low Cost Radiography. William Czygan. *Iron Age,* v. 166, Aug. 24, 1950, p. 68-72.

Use of cobalt 60 produces results equivalent to those obtained with costlier radium. Procedure and recommended practices. (S13, Co)

340-S. Hafnium-Zirconium and Tantalum-Columbium Systems; Quantitative Analysis by X-Ray Fluorescence. L. S. Birks and E. J. Brooks. *Analytical Chemistry,* v. 22, Aug. 1950, p. 1017-1020.

The X-ray fluorescence method was adapted for determination of small amounts of Hf in Zr and Ta in Cb. Curves of relative intensity of spectral lines are plotted against percentage composition. (S11, Zr, Cb)

341-S. Ultraviolet Spectrophotometric Determination of Molybdenum. George Telep and D. F. Boltz. *Analytical Chemistry,* v. 22, Aug. 1950, p. 1030-1031.

(S11, Mo)

342-S. Specific Spot Test for Gold Employing Pararosaniline Hydrochloride. Philip W. West and Jack K. Carlton. *Analytical Chemistry,* v. 22, Aug. 1950, p. 1055-1056.

Development of method, including results of extensive interference studies. (S10, Au)

343-S. Liquid Iron and Steel Temperatures in Practice. T. B. Winkler. *Industrial Heating,* v. 17, Aug. 1950, p. 1380, 1382, 1384. (A condensation.)

Development of a bath-immersion thermocouple suitable for use in the blast and openhearth furnaces. Effects of additions to the bath on temperature, drop during pouring, formation of ladle skulls, and overall temperature loss from blast to openhearth furnace. (S16, D1, D2, ST)

344-S. Quantitative Paper Chromatography on Mixed Solutions of Nickel and Cobalt, and Determination of Both Elements. A. Lacourt, J. Gillard, M. Van Der Walle. *Nature,* v. 166, Aug. 5, 1950, p. 225-226. (S11, Co, Ni)

345-S. White Fluid for Magnetic Crack Detection. *Machinery* (London), v. 77, Aug. 10, 1950, p. 183-184.

Experiments using Al powder in paraffin for dark surfaces. (S13)

346-S. Investigation of Surface Processes by Means of Radioactivity. (In German.) Hans Frauenfelder. *Helvetica Physica Acta,* v. 23, June 20, 1950, p. 347-380.

New methods for measuring desorption probabilities, sticking coefficients, and surface-diffusion coefficients by use of radioactive substances. Applications to nuclear physics are in rapid separation of radioactive elements and preparation of very thin sources. Includes specific information on surface diffusion of Cu. 65 ref. (S19, P10)

347-S. Radioactive Isotopes of Iron and Their Application in Chemistry and Biology. (In Russian.) V. I. Gol'danskii and M. B. Neiman. *Uspekhi Khimii* (Progress in Chemistry), v. 19, May-June 1950, p. 320-341.

Discusses, on the basis of the literature, physical characteristics of iron isotopes, Fe^{52} to Fe^{59}, production of test specimens of radioactive Fe, and application in chemistry, metallurgy, biochemistry, and biology. 114 ref. (S19, Fe)

348-S. Improved Method Developed for Mass Inspection of Metals. *Production Engineering & Management,* v. 26, Sept. 1950, p. 79.

Dy-Chek dye-penetrant process developed by Northrop Aircraft. (S13).

349-S. Visual Inspection Method for Light Metals. *Light Metal Age,* v. 8, Aug. 1950, p. 16-17.

Use of Dy-Chek dye-penetration method. (S13, Al, Mg)

350-S. Nondestructive Inspection Locates Minute Surface Cracks, Flaws in Metals. D. H. Stormont. *Oil and Gas Journal,* v. 49, Sept. 7, 1950, p. 69, 77.

"Dy-Chek" dye-penetrant method. (S13)

351-S. Weld Inspection Is Facilitated by the Development of an Economical New Method of Flaw Detection. Gilbert C. Close. *Industry & Welding,* v. 23, Sept. 1950, p. 30-31, 34, 46.

The Dy-Chek (dye-penetrant) method. (S13)

352-S. Why Machine Parts Fail. Part 5. Bending and Tensile Fractures. Charles Lipson. *Machine Design,* v. 22, Sept. 1950, p. 147-150.

How to recognize failures resulting from bending and axial loads. (S21, Q26)

353-S. Screwshaft Casualties — The Influence of Torsional Vibration and Propeller Immersion. S. Archer. *Journal of the American Society of Naval Engineers,* v. 62, Aug. 1950, p. 715-743. Reprinted from *Transactions of the Institute of Marine Engineers,* Jan. 1950.

Statistical and experimental survey. Various examples of failed shafts. Possible causes and conclusions. (S21, Q1, ST)

354-S. Automotive Cast Irons. Richard G. McElwee. *Foundry,* v. 78, Sept. 1950, p. 90-91, 214.

Specifications and trends. (S22, T21, CI)

355-S. Some Notes on Propeller Shaft Failures. Arthur R. Gatewood. *Marine Engineering and Shipping Review,* v. 55, Sept. 1950, p. 65-70. (A condensation.)

Cracks and failures and their causes. (S21, Q26, ST)

356-S. Gold Plate — A Subject for Controversy. Donald Wood, G. R. Frankovich, E. A. Parker, Karl Schumpelt, and Louis Weisberg. *Plating,* v. 37, Sept. 1950, p. 945-948.

Discusses Trade Practice Rules established by the Federal Trade Commission. Limitations are set for use of the word "gold" for gold alloys and for minimum thickness of gold necessary in order that the term "gold electroplated" may be used. The regulations are criticized on technical and commercial bases. (S22, L17, Au)

357-S. The Use of the Spectroscope in the Steel Industry. E. O. Waltz. *Year Book of the American Iron and Steel Institute,* 1950, p. 370-379; discussion, p. 379-382.

Previously abstracted from *Blast Furnace and Steel Plant.* See item 243-S, 1950. (S11, ST)

358-S. Recent Developments in the Non-Destructive Testing of Materials by Electrical and Magnetic Methods. W. Jellinghaus. *Engineers' Digest,* v. 11, Aug. 1950, p. 271-275. Translated and condensed from *Stahl und Eisen,* v. 70, June 22, 1950, p. 552-560.

Principles, improvements, advantages and disadvantages, and applications of electrical and magnetic methods of nondestructive testing. Also oil-bath, fluorescence, and thermal methods. 15 ref. (S13)

359-S. The Spectrographic Analysis of Magnesium in Ferrous Materials. A. Argyle. *British Cast Iron Research Association Journal of Research and Development,* v. 3, Aug. 1950, p. 521-522.

Procedure. (S11, Fe, Mg)

360-S. An Electro-Deposited Surface Roughness Standard. P. M. Aitchison. *Australian Journal of Applied Science,* v. 1, Mar. 1950, p. 71-74.

Standard consists of a lapped steel block on which are deposited thin strips of Cr of specified width, spacing, and height. This provides a known surface for use in the calibration of stylus-type, surface finish measuring instruments. (S15)

361-S. The Technique and the Possibilities of Control by Fluorescence. (In French.) R. Crédeville and H. Granjon. *Soudure et Techniques Connexes,* v. 4, May-June 1950, p. 117-118, 125.

Theoretical bases of use of fluorescence for defect detection. Apparatus and procedure, with emphasis on use for control of welds. (S13)

362-S. Nephelometric Determination of Oxygen Content of Molten Steel. (In Czech.) Miroslav Sicha. *Hutnické Listy,* v. 5, June 1950, p. 234-239.

The method and its application to 55 typical samples. Time required is 12-15 min. A modification of Herty's sampling method. (S11, ST)

363-S. Polarographic Determination of Molybdenum in Steel. (In Polish.) M. Stepien. *Prace Badawcze Glownego Instytutu Metalurgii i Odlewnictwa,* v. 2, no. 2, 1950, p. 89-92.

New method claimed to have marked advantages, including great accuracy, low reagent consumption, and necessity for ignition of the residue. (English abstract gives gist of procedure.) (S11, ST, Mo)

364-S. A New Coating Thickness Measuring Instrument. *Metal Finishing,* v. 48, May 1950, p. 64-66.

Electromagnetic device energized by standard 110 volt a.c. It is relatively insensitive to normal voltage variation, and is rapid, yet accurate. (S14)

365-S. Electronic Gages Solve Various Problems. David Fidelman. *American Machinist,* v. 94, Sept. 18, 1950, p. 95-99.

Various applications: measuring speed and accuracy on close-limit tolerances are inherent. Gaging of

work that moves continuously, checking coating thickness, and measuring wall thickness when only one side of the work is accessible are some of the uses. (S14)

366-S. New Process Checks Hardness Electronically. Chester Ricker. *American Machinist,* v. 94, Sept. 18, 1950, p. 118-120.

Automatic electronic tester with mechanized parts handling which permits 900% production increase in Chevrolet rocker arms. Machine eliminates human errors in nondestructive testing of heat treated ferrous materials. (S13, Q29, CN)

367-S. Analysis of Uranium Ores by Geiger Methods. *Canadian Mining and Metallurgical Bulletin,* v. 43, Aug. 1950, p. 461-464; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 53, p. 324-327.

A method which eliminates errors due to loss of radiation equilibrium. Beta and gamma activities are measured simultaneously in one simple operation. This method is recommended for assaying samples from milling operations. A third method is recommended for analysis of exploration samples and diamond drill cores. (S11, U)

368-S. Equilibrium Corrections in Geiger Analysis. C. LaPointe. *Canadian Mining and Metallurgical Bulletin,* v. 43, Aug. 1950, p. 465-468; *Transactions of the Canadian Institute of Mining and Metallurgy,* v. 53, p. 328-331.

β-ray and γ-ray methods. Explains inaccuracies due to disturbance of the secular equilibrium between the radioactive elements of the uranium family, caused by the milling process. Method of correction suitable for routine determinations. (S11, U)

369-S. Temperature Measurements in the Basic Arc Furnace. C. B. Post and D. G. Schoffstall. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 75-85; discussion, p. 85-89.

Summarizes experience at Carpenter Steel Co., with the optical pyrometer (1926-1947), the immersion thermocouple (1946-1948), and the present standard method, the Leeds and Northrup immersion Rayotube. (S16, D5)

370-S. Measuring Temperature of Molten Steel With Platinum Immersion Thermocouple. D. G. Harris. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 89-90; discussion, p. 90.

Advantages in accuracy and cost reduction. Developments and improvements made by Republic Steel Corp., Massillon, Ohio. (S16, D general)

371-S. Applications of Temperature Measurements at Duquesne. George E. Wagner. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 91-92; discussion, p. 98-99.

Temperature control at the Duquesne works of the Carnegie-Illinois Steel Corp. Correlation of three methods: optical pyrometer, immersion thermocouple, and experienced judgment of the melter foremen. (S16, D general)

372-S. Relative Accuracy and Cost of Using Immersion Thermocouples for Steel-Bath Temperature Control. J. G. Mravec. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 93-94; discussion, p. 98-99.

Experience at the Steel and Tube Div., Timken Roller Bearing Co. (S16, D general)

373-S. Temperature Measurement in the Electric Furnace at Atlas Steels Ltd. G. C. Olson. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 94-98; discussion, p. 98-99.

Value of the optical pyrometer. Experimentation with immersion thermocouples. Concludes that the immersion Rayotube, requiring less maintenance and giving less chance of faulty readings, provides better control. (S16, D5)

374-S. Temperature Measurement and Fluidity Tests. G. A. Lillieqvist. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 99-102; discussion, p. 102-104.

Mold assembly and temperature measurement equipment developed by American Steel Foundries, East Chicago, Ind. Results of fluidity tests are plotted for plain carbon and intermediate manganese steel. (S16, E25, CN, AY)

375-S. Temperature Measurement and Temperature Control in Steel Foundries. J. F. B. Jackson. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 104-106; discussion, p. 106-107.

Development and use of immersion thermocouple pyrometry in England. Advantages and disadvantages of the method. (S16, D general)

376-S. Melting Control With the Direct-Reading Spectrometer. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 107-110.

Use at Timken Roller Bearing Co., on alloy steel melts. (S11, D general, AY)

377-S. Precision of Spectrographic Analyses of Steel. P. R. Irish. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 110-117.

Procedure used by Bethlehem Steel Co. Variation of precision analysis with computing method, density difference of line pairs, and with wave-length separation. Overall precision. (S11, ST)

378-S. Routine Spectrochemical Analysis in the Ford Motor Company. G. A. Nahstoll. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 117-118.

The foundry, openhearth, and mobile laboratories. Analysis is applied to both iron and steel. (S11, Fe, ST)

379-S. Use of the Spectrograph in the Analysis of Special Steels. M. L. Windle and W. H. Magrun. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 119-121.

Use at Simonds Saw and Steel Co., Lockport, N. Y., as applied to alloy steels. Results of precision tests. Advantages of the spectrograph. (S11, AY)

380-S. Spectrographic Analysis of High-Alloy Steels. D. G. Schoffstall. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 122-124.

Procedure used by Carpenter Steel Co. Costs of spectrographic and chemical analyses and advantages of the spectrograph. (S11, AY)

381-S. Spectrographic Analysis by Copperweld. A. C. Hale. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 124-125.

Use of a Bausch and Lomb large Littrow spectrograph with a University of Michigan power source and microphotometer for alloy steels. (S11, AY)

382-S. Spectrographic Analysis at the American Cast Iron Pipe Company. W. R. Kennedy. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 125-126.

Procedure, precision, and cost for alloy steels. (S11, AY)

383-S. Spectroscopy at Canton Division, Republic Steel Corporation. E. O. Waltz. *Electric Furnace Steel Conference, Proceedings,* v. 7, 1949, p. 127.

Performance of unit for all types of steels. (S11, ST)

384-S. Methods of Crack Detection. Charles Lipson. "Handbook of Experimental Stress Analysis", John Wiley & Sons, New York, 1950, p. 579-592.

Devoted for the most part to magnetic, supersonic, and electrical methods; others are outlined. (S13)

T

APPLICATIONS OF METALS IN EQUIPMENT

386-T. Determining Total Water Content in Electrode Coverings. C. T. Gayley and W. H. Wooding. *Welding Journal,* v. 29, Aug. 1950, p. 629-635.

Improved method which utilizes an analytical absorption train in which the sweeping medium passes successively through a purifying and drying train, a combustion tube mounted in a high-temperature furnace, and finally through the absorption train. Using oxygen as a sweeping medium, various furnace temperatures were investigated to establish a satisfactory temperature for determining the total water content of several covering constituents and coverings of shielded metal-arc welding electrodes. (T5, 11)

387-T. Two Hospitals Feature Cast Aluminum Walls. *Modern Metals,* v. 6, Aug. 1950, p. 17-18. (T26, Al)

388-T. Aluminum Castings Used in Highly Stressed Antenna Rotator. *Modern Metals,* v. 6, Aug. 1950, p. 20. (T1, Al)

389-T. Aluminum Extrusions Provide Ideal Track for Rolling Doors. *Modern Metals,* v. 6, Aug. 1950, p. 32. (T26, Al)

390-T. How To Get More Footage Out of Hollow Drill Steel. C. W. Darby and R. M. Simpson. *Mining Congress Journal,* v. 36, Aug. 1950, p. 74-78, 83.

Methods for reducing breakage. Improvement with the use of alloy steels and new forging and heat treating methods. (T6, F22, J general, TS)

391-T. Aluminum Insulated Roofing for Farm Buildings. *Sheet Metal Worker,* v. 41, Aug. 1950, p. 35, 39.

An installation on a large poultry farm. Results of temperature studies in comparison with noninsulated chicken houses. (T26, Al)

392-T. Aluminium-Sheathed Co-Axial Cable. *Light Metals,* v. 13, Aug. 1950, p. 414-416.

Characteristics and nominal dimensions. (T1, Al)

393-T. Sugar Cane Punt. *Light Metals,* v. 13, Aug. 1950, p. 441-443.

Fabricated from an Al alloy. (T3, Al)

394-T. Aluminium Composites in Architecture. Joseph B. Singer. *Light Metals,* v. 13, Aug. 1950, p. 444-448.

Al in combination with wood, fibreboard, cork, steel, and fibreglass, glass, and bitumen. (T26, Al)

395-T. Cold Reduced Steel Gains Favor as Magnetic Core Material. Harry F. Shannon. *Steel,* v. 127, Aug. 28, 1950, p. 72-74, 84.

Improved punchability; magnetic properties equivalent to those of hot rolled sheets; and thinner, less abrasive surface oxides, which are some of the reasons electric-motor and dynamo manufacturers are using cold rolled Si-steel sheets for core material. (T1, P16, AY)

396-T. Die Castings Have Superior Electric Properties. *Die Castings,* v. 8, Sept. 1950, p. 31-32, 69.

How the electrical properties of Al, together with its advantage as a lightweight structural material, are employed by Superior Electric Co. in variable transformers for voltage regulation. (T1, Al)

397-T. Die Cast Aluminum Housings for These Drive-In Theater Speakers Made Possible a 6-Inch Cone for High Quality Sound Reproduction Without Bulkiness. *Die Castings,* v. 8, Sept. 1950, p. 33, 58-59.

(T1, Al)

398-T. Efficient Operation With Stainless Steels. *Paper Mill News,* v. 73, Aug. 19, 1950, p. 89-90.

Application in the pulp and paper industry. (T29, SS)

399-T. Steel Partitions Gain Acceptance. C. J. Nocar. *Iron Age,* v. 166, Sept. 7, 1950, p. 107-109.

Use of movable steel partitions that are only a fourth as heavy as masonry construction. Fabrication (rolling, welding, and finishing). (T26, CN)

400-T. Fold-Away Magnesium Truck Dock for Confined Areas. John Milne. *Flow,* v. 5, Sept. 1950, p. 35.

Mg platform 7x14 ft. which is rolled back when not in use to facilitate traffic in a narrow alley. (T5, Mg)

401-T. Electric Machines of High Power-Weight Ratio. H. Lanoy. *Engineers' Digest,* v. 11, Aug. 1950, p. 276-277. Translated and condensed from the French.

Previously abstracted from *Revue de l'Aluminium.* See item 280-T, 1950. (T1, T24, Al, Mg)

402-T. Spoon and Fork Production; The Sheffield Works of Viners Ltd. *Metal Industry,* v. 77, Aug. 25, 1950, p. 119-122.

Miscellaneous procedures and equipment, including melting and casting, cold rolling, annealing, descaling, press operations, plating, and buffing. Two types of nickel silver are plated with Cr, Ni, or Ag. (T10, A5, Cu, Cr, Ni, Ag)

403-T. Aluminium-Alloy Support in Steep and Medium Formations. Werner Hoevels. *Colliery Guardian,* v. 181, Aug. 24, 1950, p. 215-217. Translated and condensed from *Glückauf,* v. 85, Dec. 17, 1949.

Use of Al as substitute for timber supports in German mines. (T28, Al)

404-T. British Buses and Australian Automobiles Using Light Alloy. (In French.) *Revue de l'Aluminium,* v. 27, June 1950, p. 234-235.

Use of Al alloys and cost savings because of weight reduction. (T21, Al)

405-T. Weldments or Castings: A Case of Good Judgment. M. R. Nelson. *Iron Age,* v. 166, Sept. 14, 1950, p. 98-100.

Use of castings replacing welded structures for worm gear drives, eccentric hubs, connecting rods and other parts. By using Meehanite castings with a yield point very near the breaking strength, stronger and cheaper parts were obtained. (T7, CI)

406-T. Metal Problems in the Container Field. Neil M. Waterbury. *Glass Industry,* v. 31, Sept. 1950, p. 453-454.

Previously abstracted from *Ceramic Industry.* See item 210-T, 1950. (T29)

407-T. Five Diesel Valve Troubles. What Causes Them; What Relieves Them. *SAE Journal,* v. 58, Sept. 1950, p. 58-63. Excerpts from "Valve Problems in Diesel Engines" by Vincent Ayres.

Breakage, seat wear, valveface guttering, stem and guide wear, and sticking. Fundamental causes, including design, materials of construction, fuels, and lubricants. (T7, Q9, AY)

408-T. Outstanding Applications of Aluminium Alloys. *Metallurgia,* v. 42, Aug. 1950, p. 116-119.

Three recent examples (two in structural work and one in a semi-trailer unit.) (T26, T21, Al)

409-T. Steels for Tapered Roller Bearings; Factors Affecting Manufacture and Service. J. H. Evans. *Metallurgia,* v. 42, Aug. 1950, p. 140-144.

Selection factors; microstructure, mechanical properties, and heat treatability of various types. (T7, AY)

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V

MATERIALS
General Coverage of Specific Materials

168-V. Bismuth. J. Lomas. *Mine & Quarry Engineering,* v. 16, Sept. 1950, p. 289-292.

Ore deposits, resources, beneficiation, metal production, properties, applications, etc. (Bi)

169-V. Properties of Niobium. J. Lomas. *Canadian Mining Journal,* v. 71, Aug. 1950, p. 54-55.

Resources, miscellaneous properties, alloys, and uses of niobium, usually known as columbium. (Cb)

170-V. Industrial Value of Bismuth; Expanding Range of Metallurgical Applications. *Chemical Age,* v. 63, Aug. 19, 1950, p. 258. Condensed from *South African Mining and Engineering Journal,* v. 61, Part 1.

(Bi)

171-V. Two New Titanium Alloys Now in Production. D. I. Brown. *Iron Age,* v. 166, Sept. 14, 1950, p. 85-88.

High-strength 7% Mn alloy for sheet applications and a 4% Mn, 4% Al alloy for high-strength forging and bar applications. The alloys are transformation hardening and of the two-phase type. The sheet grade has a minimum yield strength of 130,000 psi. Welding characteristics. (Ti)

172-V. Another View of Nodular Cast Iron. C. E. Herrington. *Product Engineering,* v. 21, Sept. 1950, p. 214, 216, 218.

Refers to article by Charles K. Donoho (Apr. issue, item 85-V). Limitations and present gap between experimental results and commercial development. Believes that further development work is required before nodular iron can be classed as a fully proven engineering material. (CI)

173-V. High Temperature Alloys Based on Titanium Carbide. E. M. Trent and J. Bateman. *Metallurgia,* v. 42, Aug. 1950, p. 111-115.

Reviews and correlates the literature. The low specific gravity of alloys containing a large proportion of TiC makes them particularly suitable for turbine rotor blades. Physical and mechanical properties and microstructures of various compositions. (Ti. SG-h. j)

EMPLOYMENT SERVICE BUREAU

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